(Ireland.)

THE

SECOND REPORT

OF THE

COMMISSIONERS

Appointed to enquire into the Nature and Extent of the several

BOGS IN IRELAND,

AND THE

PRACTICABILITY OF DRAINING AND CULTIVATING THEM.

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TO THE

Right Honourable and Honourable the Knights, Citizens, and Burgeſſes, of The United Kingdom of Great Britain and Ireland, in Parliament aſſembled.

SECOND REPORT

OF THE

COMMISSIONERS appointed to enquire into the Nature and Extent of the several BOGS in IRELAND; and the Practicability of DRAINING and CULTIVATING them.

IN our Firſt Report we ſubmitted to your Honourable Houſe our general view of the extent and nature of the Bogs of Ireland, accompanied by a detailed Report from one of our Engineers, upon a portion of the Bog of Allen, containing 36,430 Engliſh acres; we now proceed to lay before your Honourable Houſe the following Reports which we have ſince received from our Engineers.

	Containing of Bog Engʰ Acres.
1ſt. From Mr. Richard Griffith, junior, on the Weſtern Diviſion* of Diſtrict No. I. or the Diſtrict of the River Barrow - -	41,075
2d. From Mr. Jones, on Diſtrict No. IV. or the Diſtrict of the River Boyne - - - - - - - - - - -	42,370
3d. From Mr. Longfield, on Diſtrict No. V. or the Diſtrict of the River Bruſna - - - - - - - - - -	44,594
4th. From Mr. Townſhend on Diſtrict No. VI. or the Diſtrict of the Shannon - - - - - - - - -	34,500
5th. From Mr. Edgeworth, on Diſtrict No. VII. or the Diſtrict of the Inny and Lough Ree - - - - - - -	34,569
Total Engliſh acres comprized in this Report - - -	197,108
Which, together with the Bogs included in our Firſt Report	36,430
- - Make in the whole - - Engliſh acres	233,538

In our Firſt Report we were enabled to come to this general concluſion, that about 6-7ths of the Bogs of Ireland are contained within a portion of the Iſland of little more than one-fourth of its entire ſuperficial extent, included between a line drawn from Wicklow head to Galway, and another drawn from Howth head to Sligo; in its form reſembling a broad belt drawn acroſs the centre of the Iſland, with its narroweſt end neareſt to the Capital, and gradually extending in breadth as it approaches to the Weſtern Ocean. This great diviſion of the Iſland extending from eaſt to weſt is traverſed by the Shannon from north to ſouth, and is thus divided into two parts; of theſe the diviſion to the weſtward of the river contains more than double the extent of the Bogs which are to be found in the diviſion to the eaſtward; our preſent and our former Report taken together, include all the Bogs which lie in this diviſion to the eaſtward of the Shannon, except a ſmall detached diſtrict of 4 or 5,000 acres in the County of Kildare, which we gave in charge to Mr. Braſſington, and whoſe

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* For his Report on the Eaſtern Diviſion of this Diſtrict, ſee the Appendix to the Firſt Report of the Commiſſioners.

Report we did not receive in time to include in this Statement. These Bogs forming the subject of our Firſt and of our preſent Report, and including not only the whole of what is usually denominated the Bog of Allen, but also the Bogs in the counties of Longford and Weſtmeath, may be considered generally as divided into *five* great Diſtricts very diſtinct from each other. The firſt, comprizing 77,505 Engliſh acres of Bog, has its natural falls for the ventage of its waters to the river Barrow.

	Feet.
The greateſt height of the surface of the Bogs in this Diſtrict above the sea at high water mark in Dublin Bay, is	315.
Their leaſt height	189.
Their greateſt depth	41.
Their average depth	22. to 25.

This Diſtrict forms the subject of Mr. Richard Griffith, junior's, 1ſt and 2d Reports.

The next of these Diſtricts (No. IV. reported on by Mr. Jones) may properly be denominated the Diſtrict of the Boyne, as almoſt all the waters of its Bogs are discharged into the sea through that river.

The greateſt height of the surface of the Bogs in this Diſtrict above the sea at high water mark in Dublin Bay, is	336.
The leaſt height (as we collect from Mr. Jones's table)	218.
Their greateſt depth	40.
Their average depth	22 to 25.

The third and fourth of these Diſtricts are separated from those already mentioned by a high and broad tract of comparatively dry country, which ſtretches north and south of Tullamore; these two Diſtricts have their natural falls to the river Shannon, and are divided from each other by the river Brusna: of these the Diſtrict to the northward of the Brusna contains 34,500 Engliſh acres of Bog, and forms the subject of the Report of Mr. Townſhend.

The District to the southward of the Brusna contains 44,594 Engliſh acres, and is reported on by Mr. Longfield.—Of the Bogs in Mr. Townſhend's Diſtrict,

	Feet.
The greateſt height of the surface above the sea at high water mark in Dublin Bay, is	274.
Their leaſt height	114.
Ther greateſt depth	44.
Their average depth	30.

And in Mr. Longfield's Diſtrict,

Their greateſt height above the sea	310.
Their leaſt height	111.
Their greateſt depth	45.
Their average depth	22 to 25.

The fifth of these Diſtricts, reported on by Mr. Edgeworth, contains two tracts of Bog, amounting in the whole to 34,611 Engliſh acres. Of these the firſt lies on the banks of the river Shannon, and depends on it for its drainage; the latter discharges its waters into the river Inny, which also flows into the Shannon. The Bogs in this Diſtrict are deeper than any others we have observed.

	Feet.
The greateſt height of their surface above the sea at high water mark in Dublin Bay, being	253. 8.
Their leaſt height	176. 8.
Their greateſt depth	47. 0.
Their average depth	30 to 35.

Thus it appears that these Bogs (presenting in every inſtance sufficient falls for their drainage) discharge their waters into the sea, in widely different directions; those from Mr. Richard Griffiths, junior, and Mr. Jones's Diſtricts, flowing into the Iriſh Channel; the former by the Barrow at Waterford, the latter by the Boyne at Drogheda: while the waters of the Bogs in Mr. Longfield's, Mr.

Townſhend's, and Mr. Edgeworth's Diſtricts, are ultimately carried by the Shannon into the Atlantic Ocean.

We propose to accompany our next Report with an Index Map, exhibiting the connection of these and other Diſtricts.

In comparing the Reports of our Engineers with each other, we find, as might be expected, considerable difference of opinion as to the moſt eligible modes both of draining these Bogs, and of reducing them to a ſtate of cultivation. They all however agree not merely as to the perfect practicability in every inſtance of reclaiming them, but also that the measure would be attended with a very great degree of profit; and we are far from being disposed to believe, when they propose different means for arriving at the same end, that one only can be right.

We ſhall now endeavour to present the result of their opinions to your Honourable House, and for greater clearness, ſhall class them under the different heads:

1ſt. Of Drainage.	3d. Of Planting.
2d. Of Agriculture.	4th. Of Eſtimates and Expense.

On the Drainage of Bogs.

IN the several Diſtricts which have been reported on, the Bogs are intersected by ſtreams, the channels of which are generally in the under ſtrata, usually consisting of gravel or clay, and thus suited to become the principal outlets for the waters taken off the interior of the Bogs; and on the surfaces of the Bogs there appear to be abundant falls towards these ſtreams, to carry into them the surface water, by the means of such drains as the Engineer may judge to be expedient.

It will not be necessary to deepen or alter the course of any great River for the purpose of carrying off the water drained from these extensive tracts; some alterations, however, are proposed by the Engineers, to be effected in the lesser ſtreams, the expense of which will be covered by the improvement of the adjacent flooded lands. We ſtate this, because it has been erroneously conceived, that if any considerable proportion of the Bogs of Ireland were to be drained, it would be necessary to execute expensive works in deepening or altering the channels of some of the principal Rivers.

We feel it necessary to enter into some detail on the different modes of Drainage which have been proposed to us, on account of the differences of opinion which we have already ſtated to exiſt among our Engineers; and also because it is a general topic of inquiry, whether deep or surface drainage is beſt adapted to the reclamation of Bog; on which some have even gone so far as to doubt the practicability of draining Bog at all, without sinking to the under ſtrata.

This is a point of great importance, because it muſt be evident that to sink drains to the bottom of Bogs, so deep as those reported on, would occasion such an expense as the subsequent improvement of the land would hardly cover, and the expediency of the project of draining the Bogs of Ireland, if it reſted on this point, might be doubtful.

But we have the moſt satisfactory proof, in the Reports of our Engineers, that such deep drainage is not necessary, and that the surface of a Bog may be highly improved, so as to bear crops, without drawing off the water from the lower ſtrata.

Mr. Longfield ſtates that the vegetable matter of which the Bogs in his Diſtrict are composed, is *perfectly* retentive of water, so much so, that the numerous duck-pools and lodgments of water in Bogs are almoſt all upon different levels; and that in the 10th division of his Diſtrict, there exiſt two considerable bodies of water at the diſtance of a few perches only from each other, and yet differing two feet and an half in the levels of their surfaces.

Mr. Edgeworth remarks, that in Bogs No. 1. and 9. in his diſtrict, some drains, six or seven feet wide and as many deep, had been made from the centre of the Bog to its outlet; these were about 20 perches asunder, and although they had been finiſhed for 20 years and were not choaked up, the Bog between them did not appear to have been affected by them. He also ſtates that deep drains do not carry off the water from any considerable extent of the adjoining surface.

On this part of the inquiry, Mr. Richard Griffith junior's observations appear to us to be worthy of great attention. "The practicability of draining very wet "Bogs, he says, has been doubted by many sensible men, from the fact (which "is undeniable) that 10 or 15 yards towards the interior, from the face of a turf "bank, the surface of the Bog is frequently found extremely wet, and therefore "(it is said) if the surface of a Bog near the edge of a turf bank (from whence "there is always a fall of at leaſt 10 or 12 feet) be not drained, it cannot be "expected that any ſyſtem of drains will ever accompliſh that end." But in answer to this he observes, "That the surface of all Bogs near the edges is much "lower than the interior, where the springs are usually situated which chiefly "supply the water contained in the Bog; the water from these sources naturally "flows towards the exterior, which is on a lower level. How can it be expected "that turf banks formed at the edges of Bogs so situated, will prevent the flow "of the water from the interior? Owing to the side cuts usually made, will they "they not have a tendency to draw more water to those points than would have "naturally flowed there? But if the drains proposed in his Report (he observes) "were cut in any Bog, the water from the interior would be *arreſted in its* "*progress towards the edge*, and quickly discharged by the minor and cross "drains. The natural consequence of the adoption of such a ſyſtem, in his "opinion, muſt be nearly perfect superficial consolidation."

In these observations, Mr. Richard Griffith junior appears to us to have well answered the objection as far as it reſts on the observed effects of turf banks, and with respect to the other difficulties, we may remark, that lakes in Bogs, such as Mr. Longfield notices, are situated in hollows; that the Bog ſtuff forming their banks is always, with respect to the reſt, in a ſtate of comparative solidity, whether rendered so by diſtinct causes previous to the formation of the pools (which seems very probable) or by the decomposing effects of a body of water gradually reducing it to puddle, in which ſtate it is afterwards dried and hardened in summer. The drains mentioned by Mr. Edgeworth, were probably insufficient in size or number to carry off the water of the Bog, which was retained in every part of it by the capillary attraction of its fibrous texture.

Mr. Townſhend's observations throw further light upon the subject; he informs us, that ſtrata of turf of a firm and close texture, impervious to water, exiſt in every Bog; and he is decidedly of opinion that the springs under the Bog do not penetrate upwards through this subſtance, but that the wetness of the Bog is caused by the rain water falling on the surface and lodging in the small cracks and fissures, and in the spongy texture of the surface moss and other vegetation, which varies in depth according to its nature and quality; these ſtrata retain the rain-water until it is exhaled by the atmosphere, or is slowly drained by the natural descent of the surface.

But we do not feel it necessary to adduce many arguments or further observations on this queſtion, as we have the evidence of some thousands of acres of Bog in different parts of these diſtricts, which have been thoroughly drained and profitably improved; a circumſtance that would never have taken place, if the very nature of the subſtance, and not more probably some local cause, opposed such difficulty to the undertaking.

We ſhall now give an abſtract of the ſyſtem of Drainage recommended by our several Engineers, so as to bring together, at one view, the information we have obtained, as far as the limits of a Report will admit.

Mr. Longfield, arguing upon the retentive nature of Bog, considers that the efficacy of drains is not proportioned to their depth beyond a certain extent; his ſyſtem is therefore one of main, minor, and cross drains of moderate dimensions; which he recommends on consideration as well of the nature of the undrained Bogs in his diſtrict, as of the mode of drainage adopted in parts already reclaimed. The main drains he proposes to be from 10 to 15 feet in depth, the surface drains to be 4 feet in depth and 4 feet in breadth, with perpendicular sides. This form of drain Mr. Longfield is induced to recommend, from his having found that such drains ſtand remarkably well, even where they have been 7 feet deep and 4 feet wide (as may be seen now in the *Red Bog of Lettybrook)* and are easily passed over, and not liable to be choaked by accidental crumbling of the banks. To the objection, that the sides of perpendicular drains in soft Bogs would collapse or close together, he answers, that experience proves the contrary; that perpendicular sides do not retain or catch the waters falling on the surface, but harden, and become in fact "a Bog wall," supported and kept together by its unbroken fibres from top to bottom; whereas the sides of sloped drains being exposed to the weather, are kept in nearly their original ſtate of wetness. This form, however, Mr. Longfield does not recommend for the principal or main drains, the talus or slope of which he does not particularize.

In laying out his drains, Mr. Longfield has always kept in view the employing them as small Canals, for the conveyance of gravel or manure through the Bogs; and as his diſtrict affords great facilities towards this important object, he has been enabled to accompliſh it in many inſtances, his main drains being frequently carried from the foot of a gravel hill or mound of clay, through the adjoining tracts of Bog. He has also made provision for carrying into effect a syſtem of irrigation, the efficacy of which he considers to be great in the reclamation of Bog.

Mr. Longfield's diſtrict appears to afford more inſtances of the improvement of Bog, than the others now under consideration; one inſtance we select as a practical example of the efficacy of a judicious syſtem of drainage; it is related in the Report on the 12th division of the Bogs in his diſtrict.

Mr. Molloy, of Clonbealymore, he ſtates, has moſt judiciously effected the drainage of about 170 acres of Red Bog, besides bringing into a profitable ſtate a great portion of moor and bottoms round the Island of Clooneen. The quantity of drains which he found necessary is marked on the Map, affording a good specimen of the number that may be required for the drainage of the whole; but, however, we are to consider, that his surface drains were unassiſted by any main tap, and therefore the Bog required more of them than will be found requisite when they are intersected by the great main drains proposed. Mr. Molloy's drains are not large, but numerous, being in general from 3 to 5 feet deep; and the effect of them is such, that the heavieſt beaſt may pass over his Bog in summer-time.

Mr. Edgeworth does not approve of a general syſtem of deep drainage; partly because he considers deep drains to be little more effectual than ſhallow, and partly because he disapproves of employing them as canals for conveying manures, being of opinion that the loading and unloading the boats, which muſt be done by wheel-barrows, would be too expensive. In lieu of canals, he has proposed wooden Railways, with carriages adapted to them, on a moſt ingenious plan of his own invention, as detailed in the Appendix to his Report. He therefore has not given levels for carrying such canals or deep drains through the Bogs of his diſtrict *(to which he expressly confines his opinions)* but recommends, in preference, surface drains of smaller dimensions; the larger to be 5 feet deep and 3 feet wide, the smaller to be of 18 inches in depth, and of a breadth varying according to the wetness of the Bog. He also recommends, that the sides of the drains ſhould be perpendicular, remarking, that in turf banks the sides which are perpendicular do not give way; the bottom or sole of the drain, he proposes to form in the ſhape of an inverted arch, so as to reſiſt the lateral and upward pressure of the mass of Bog, and to form a narrow channel for the water, whereby its current will be accelerated, and will keep the drain free.

In detailing the account of an improvement effected by him in a Bog of 27 acres, Mr. Edgeworth remarks, that only a few slight surface drains of small dimensions were made, which sufficiently drained this Bog; but he also observes, that the Bog was inclosed with a seven-foot ditch, in part sunk to the under ſtratum of clay; and further, that the Bog having been in part cut out, its depth did not exceed four or five feet: this improvement therefore does not afford proof that a similar ſyſtem of drainage would be effectual in Bogs of so great a depth as 30 or 40 feet.

Mr. Edgeworth has recorded a remarkable occurrence, which is in favour of a ſyſtem of deep drainage, wherever it can be effected without incurring too heavy an expense. The Bog of Rine, situated on the banks of the River Camlin, in the county of Longford, of an average depth of 35 feet, and having a considerable inclination towards the river, suddenly burſt on the night of the 16th December 1809; great part of the soft ſtuff of which it was internally composed, slipped towards the river and into its channel, without carrying away the surface of the Bog, which however sunk considerably; the internal water of the Bog was let off, and about 20 acres of the surface, which had been so wet as to be scarcely passable, became completely drained in the course of a fortnight. The details of this singular fact are intereſting in many points of view; and it shews, that where an exit is given for the waters of a Bog, at a considerable depth beneath the surface, the effect in draining the Bog is very rapid and considerable; probably from the pressure of the incumbent ſtrata accelerating the issue of the waters.

Mr. Edgeworth has invented a plough (which he calls a Seton-plough) adapted to surface draining; it is described in the Appendix to his Report, and appears well worthy of attention: it has not yet been sufficiently tried to enable us to pronounce on its merits; experience will demonſtrate how far it is applicable to the drainage of Bogs.

Mr. Richard Griffith junior, in his former Report, had recommended a ſyſtem of drainage which ſhould divide the Bogs into fields of ten Iriſh acres; he has since re-considered this part of the subject, and thinking that such divisions would be too large for convenience, and also that in certain situations the centre of the field might remain too wet for agricultural purposes, he now proposes that, in addition to the three classes of drains proposed in his former Report, a fourth class, which he calls *Surface* Drains, ſhould be executed; and he places them at such diſtances, as, with the larger classes of drains, will divide the Bog into portions of $3\frac{1}{3}$ Iriſh acres.

His revised ſyſtem of drainage, therefore, is as follows:

1ſt. Main drains in the loweſt situations, their dimensions, 14 feet top, 2 feet bottom, and 12 feet in depth. 2d. Minor drains, falling into the main drains obliquely, and in such direction as will give the greateſt fall to the water; their dimensions 9 feet top, 1 foot bottom, and 8 feet in depth; these minor drains to be sunk at the diſtance of a quarter of an Iriſh mile from each other. 3d. Intermediate between the minor drains, and parallel to them, Mr. Griffith proposes to cut drains of ſtill smaller dimensions, viz. 6 feet top, 1 foot bottom, and 5 feet deep; and further at right angles to the minor and intermediate drains, a ſyſtem of cross drains of dimensions similar to those of the intermediate drains, is proposed to be carried 280 yards asunder, which would divide the Bog into square fields of 10 Iriſh acres. Laſtly, he proposes surface drains, of 4 feet breadth at top, 1 foot bottom, and 3 feet depth, intended to divide the 10 acre fields into three parts, by two drains to be cut parallel to the minor and intermediate drains, that is, in the direction of the fall. The whole of the foregoing drains would divide the Bog into rectangular patches of 280 yards long by $93\frac{1}{3}$ broad; and Mr. Griffith considers this general ſyſtem of drains quite sufficient for that high and porous species of Bog which abounds in his diſtrict, and which in his description of the several species of Bog, he denominates "Fibrous or Red Bog."

To explain this ſyſtem more clearly than by any general description, Mr. Richard Griffith junior has annexed to his Report an *enlarged* Map of Geaſhill Bog, exhibiting the main, minor, intermediate, cross and surface drains, all laid down in their proper situations.

Mr. Richard Griffith junior enters at large into the queſtion of the proper form for drains, observing previously, that he has been induced to recommend the plan already detailed, from observing that similar drains made by the Grand Canal Company in the Bogs of his Diſtrict have answered perfectly well. The chief desideratum he ſtates, in cutting Bog drains, is to form them in such a manner that they ſhall keep themselves clean, and that their sides ſhall have no tendency to fall in or collapse. The firſt of these objects he thinks may be obtained by making the bottom of the drains sufficiently narrow, that is, proportioned to the quantity of water which is likely to pass through them, and the sides may be prevented from falling in by giving them a sufficient slope; that which he has recommended is 6 inches increase of width on either side for every foot in height; thus the proposed dimensions of minor drains are 9 feet top, 1 foot bottom, and 8 feet deep. He observes, that the Bog drains which he has seen made with perpendicular sides, are always in firm Bog, and that in his opinion, it is utterly impracticable to form such drains in very wet Bog. Drains of this description have always a tendency to choak, as they muſt necessarily be made 3 feet broad at bottom (if the drain be 4 or 5 feet deep) to allow the workmen room to throw out the Bog ſtuff; their sides muſt also be expected to fall in, unless the Bog be very compact; even turf banks, which are always made in the drieſt and moſt compact parts of the Bog, he observes frequently fall in in winter, and almoſt universally crack behind and hang over. In fact, every kind of Bog drain will in time become narrower at top than when orginally formed; the drains made by the Canal Company, as before mentioned, were cut with a slope equal to what he recommends, and have now become considerably narrower at the top; had they been made originally with perpendicular sides, they muſt, he observes, have long since fallen in. He is induced further to recommend drains narrow at bottom from a consideration of economy, as they contain fewer cubic yards in a running perch of work, and the principal part of the excavation is at the surface where no pitching is required.

Mr. Townſhend's plan of Drainage is formed on somewhat different principles; he has kept in view the formation of Canals, not only for the conveyance of manure towards the reclamation of the Bogs, but for permanent navigable communications between the Bogs and the great rivers adjacent. He has also formed his syſtem of drainage upon the idea, that it is necessary to retain the lower ſtrata of Bog in a ſtate of moiſture, after the surface ſhall have been freed from water.

In determining on the levels beſt suited to these Bogs, Mr. Townſhend has therefore calculated on retaining the surface of the water in the proposed drains at leaſt on an average two or three feet below the surface of the Bog in summer, when there is 5 feet depth of water in the drains, and he proposes to make sluices and overfalls in every level or reach, in convenient places, where there is a natural fall towards the Shannon or any other river for discharging the surplus water in times of heavy rains, and also for drawing off the water in the navigable drains, so as to reduce the depth to 3 feet only in the winter season; the surface of the Bog will then be 4 or 5 feet above the level of the water in the drains, and the depth of water, he ſtates, will ſtill be sufficient for the boats. This difference of level between the surface of the Bog and the surface of the water, Mr. Townſhend thinks, will be fully sufficient to answer the purpose of agricultural improvements, and the proposed regulations of winter and summer levels will prevent the inconvenience of a want of water in dry seasons for the purpose of promoting vegetation, for the use of cattle, and for irrigation, where that is practicable. Should the Bog subside too near the level of the water, the drains may be re-sunk, and Mr. Townſhend prefers this to the sinking deep drains at once, they being more liable to collapse; he however does not think that the surface of the Bog will subside considerably, so long as the water is kept in the drains.

Mr. Townſhend has laid out his main drains principally with a view, as it ſhould appear, to their being used as Canals, and therefore has calculated on dimensions of 29 feet breadth at the water surface, 14 feet breadth at the bottom, and 5 feet depth of water. The collateral or minor drains he proposes to be 22 feet in breadth at top, 7 feet at bottom, and of a depth to give 5 feet water; these latter he thinks will be adequate to the purpose of Canals for carrying out manure, and for local communication: he recommends them in preference to the larger Canals, as sufficient for the present, and we are disposed to consider that drains even on a smaller scale will answer the purpose. The spaces on each side of the main drains and collateral cuts, he thinks, can very easily be drained by common drains, 6 feet wide at top and 4 feet deep, at an expense not exceeding that of making proper fences for inclosing and dividing the Bog into convenient fields; the cuts are so laid out, that the intervening space seldom exceeds 80 perches Iriſh, or 560 yards in breadth.

We apprehend that Mr. Townſhend has carried our inſtructions in respect to the eventual conversion of main drains into navigable Canals, somewhat beyond our intention in the firſt inſtance. It would appear from his Report, as if the principal object of research were the intersection of the Bog in all directions with navigable cuts and that the drainage of these waſtes were only a secondary consideration; under this impression, we conceive that he retains the water in his navigable cuts, much too near the surface of the Bog to admit of complete drainage, and that he has laid them out, in the firſt inſtance, upon a scale far beyond what would be necessary to effect that prime object, and has thereby materially augmented their expense; to which muſt be superadded the necessary accompaniments of inland navigation, viz. Locks, Sluices, Aqueducts, inclined planes, Embankments, &c. &c. to a very considerable amount. Whenever the Bogs ſhall have been perfectly drained, it will doubtless be a matter well worthy the consideration of the proprietors to obtain navigable communications with the main land, for the purpose of procuring gravel, lime, &c. and for the more easy and cheap conveyance to market of the produce of the Bogs; but as we conceive that this is only a matter for future consideration, no further attention ought now to be paid to it than may be sufficient to cause the main drains to be laid out in such directions as may not be inconſiſtent with the future attainment of so desirable an object.

The ſyſtem of drainage which he proposes will, he thinks, answer for all decriptions of Bog; whether deep or ſhallow, the depth of the Bog or Peat he considers to be of no consequence in determining the position of the drains, which are to suit the level of the surface; nor does he conceive it at all necessary to sink them to the full depth of the Bog, with an intention of draining or tapping the water from it, because (excepting a few feet near the surface) the great mass of Bog or Peat he considers to be a subſtance impervious to water. This observation, however, appears in the subsequent part of this paragraph to be applied principally to black Peat or Turf, which is far more firm and close in its texture than fibrous or red Bog.

That description of Moss which retains moſt rain water, he says, has the quickeſt growth, hence we often find the ſofteſt parts of the Bogs in the moſt elevated places, and in many inſtances, even higher than the surrounding lands; and on the contrary, hard firm Bog on the loweſt levels; which Mr. Townſhend thinks is a convincing proof, that springs or rivers are not a principal cause of the fluidity of Bogs, but rather that they do not ascend into it at all. He ſtates, in further corroboration of this opinion, that considerable tracts of Bog have their base much above the level of the natural outlets, and so that it is probable that any springs which may be underneath the Peat penetrate through the sand or porous ſtrata, or the interſtices of rock, into the adjacent rivers. The inference which Mr. Townſhend draws from these premises is, that small drains, with levelling and trimming the surface, will effect the purposes of drainage completely; and that the immense saving of expense, time and riſk in execution, together with the conveniences and advantage they will afford, will make them preferable beyond comparison to the deep ones.

Mr. Jones also agrees in the extreme tenacity of the matter of which Bogs are composed, which causes the rain water to be retained on their surfaces, thereby chilling vegetation; he nevertheless considers that these Bogs can be easily drained, the outlets of waters being considerably lower than the surface. His main drains are laid out according to circumſtances (at about 80 perches asunder) and the transverse drains crossing the main drains generally at right angles to them, are also laid out at the diſtance of 80 perches from each other; the principal consideration has been, to point them in such directions as to give the waters the greateſt fall from the summit of the Bogs to their outlets or natural discharging points.

The main drains through the deep and wet Bogs, Mr. Jones proposes to be sunk from 14 to 16 feet in depth from the present surface, and to be two feet wide at bottom. The transverse drains to be sunk from 10 to 12 feet, and to be also two feet wide at bottom; to these he adds intermediate drains, midway between both the main and transverse drains, to be sunk 5 feet in depth. Wet Bogs, he observes, will not admit of drains of the above description, being sunk at once to their full depth, as the sides would have a tendency to close together, and the bottom to rise and swell up; time therefore muſt necessarily be given for the sinking. Mr. Jones has detailed in his Report a very simple mode of sinking drains of large dimensions, by working at intervals, and allowing the Bog time to subside. The Plate annexed to his Report explains this method clearly, and it seems applicable, with moſt advantage, to very wet Bogs, in which it will save the excavation of 58 cubic yards of Bog in every running perch of 21 feet; and by this manner of operation, he thinks the danger of collapsing will be avoided. He further recommends that frequent borings ſhould be made in the drains with an augre of 3 or 4 inches diameter, to give vent to the springs, the beneficial effect of which he has frequently observed.

Mr. Jones conceives, that to form navigable Canals in the firſt inſtance through the Bogs, would interfere with their effectual drainage, and proposes therefore, that the main drains ſhould not be formed into Canals until the drainage ſhall have been completed; at which period he thinks this plan will be advantageous: this observation we consider to be judicious, and are of opinion, that Mr. Jones's suggeſtion ought to be observed.

In draining a large tract of Bog, it is necessary to be cautious leſt the operation be carried too far; for it appears, that to render the surface of a Bog perfectly dry, would be prejudicial; there are limits beyond which its drainage muſt not be effected. Red Bog, as Mr. Richard Griffith junior observes, when firſt drained, is extremely porous and open in its texture, on which account it is liable to become so dry in summer, that the natural grasses die for want of moiſture; but in process of time, the surface of drained red Bog, by exposure to the atmosphere is decomposed, becomes compact, and capable of supplying food and moiſture to plants in dry weather.

Mr. Longfield is equally aware of this, and relates facts which prove that vegetation is completely checked on the Bogs by drought; he has therefore contrived his drains so, that when the Bog ſhall be reduced to a ſtate of cultivation, they can be dammed up, and the water generally diffused over the surface, for the purpose of irrigation.

Mr. Townſhend seems more apprehensive than any of our other Engineers, of the prejudicial effect of extreme drainage, so far, that besides his plan for retaining the water in his drains within a few feet of the surface, he proposes to take in several ſtreams from the adjoining lands, in addition to the soakage from the Bogs, to ensure a sufficient supply of water in all seasons.

It is obvious, that if a general drainage of the Bogs in any Diſtrict ſhould be carried into effect, the neighbouring ſtreams and brooks, into which the waters of the Bog will then be suddenly discharged, will be subject to frequent and violent floods; provision muſt be made to obviate this, by deepening the beds, and removing the obſtructions in the channel of these small rivers, sufficiently to render them capable of effecting the quick discharge of the waters, without flooding the country, as otherwise, the injury that might be produced by the floods in the low lands would counterbalance the advantage of drainage in the Bogs. Our Engineers, where such operations appeared necessary, have given Plans for effecting them, with the proper Sections; and the expense is included in their respective Eſtimates.

They have also taken into consideration and described the proper sites for such Mills as may be necessary, and such alterations in the existing Mills and Weirs as may be required towards the draining of the adjacent Bogs.

It muſt be expected, that with whatever ſkill and attention the drains be executed, they will in many inſtances be exposed to accidents, and for the firſt few years at leaſt, will suffer from the extreme wetness and want of compactness of the soil, by collapsing at the sides, and by the effect of surface rills of water, and of the heavy rains in winter time. It will therefore be necessary, after the drains ſhall have been executed, to pay attention to them for a certain time, that they may be kept open, and their channels afford a free course for the waters.

Mr. Richard Griffith junior recommends, that after the drains ſhall have been completed, the Bog ſhould be suffered to remain for 18 months or perhaps two years, to subside; during which time, labourers ſhould be employed under the direction of a competent overseer, to remove obſtructions and to keep the drains in perfect repair; and he has included in his Eſtimate the expense of this operation.

We are fully aware, and our Engineers seem equally impressed with the opinion, that it is impossible to lay down any general ſyſtem of drains which could be accurately followed in every inſtance; local circumſtances muſt always be attended to; the different degrees of the wetness of Bogs, the varieties in their texture affecting the degree of tenacity with which they retain water, the form of the surface giving different falls for the drains, and many other particulars muſt be taken into consideration; and every plan, however perfect in general, muſt arrange itself according to them. We therefore consider that the differences in the Reports of our Engineers on this head, and the variety of opinions as above ſtated, so far from being a subject for doubt or objection, in fact render their Reports more valuable; what is suggeſted by one may apply better to a particular case than the plan of another, and the very discussion to which their differences of opinion will probably lead, we think will finally prove of advantage. Upon these principles therefore, we are of opinion, that neither deep nor ſhallow drainage is to be exclusively preferred, but that wherever extensive Bogs are to be drained, main and minor drains will be required for the purpose, to act as receiving drains for the water, which a ſyſtem of numerous small surface drains muſt collect in considerable quantities; and we are inclined to consider that a plan of drainage embracing a system of main, minor, and surface drains, will be found moſt universally applicable.

We also conceive that it may hereafter in many inſtances be desirable to combine with the drainage of the Bogs, a ſyſtem of internal navigation, on a very reduced scale, for the conveyance of gravel and other manures to the Bogs, and we look upon Mr. Edgeworth's invention of wooden Railways and Carriages, and Mr. Townſhend's plan for using light Waggons on floats, as valuable auxiliaries towards this important ſtep in the progress of the reclamation and further improvement of Bog.

Agricultural Reclamation of Drained Bog.

ON this important part of the subject some of our Engineers have furniſhed us with much detailed and highly valuable information. Mr. Professor Davy has also been so obliging as to give us the general outline of his opinion on the subject: his Answer to a letter from our Secretary is subjoined as the 10th Article of our Appendix.

Mr. Richard Griffith junior has suggested to us different processes by which the drained Bog may be brought into a ſtate of Reclamation applicable to several purposes, and yielding various degrees of profit corresponding to the different rates of expense proposed to be incurred, accompanied by very detailed Eſtimates of the expense, and of the profit that may be expected, founded upon the result of numerous inquiries as to the modes which have been pursued, and the coſts of the various improvements already effected. These Observations and Eſtimates appear to us to be well worthy of attention. He begins, as has been already observed, by recommending that after the several drains ſhall have been completed, the Bog ſhould be suffered to remain for eighteen months or perhaps two years to subside, during which time it will be necessary to employ a sufficient number of labourers under the direction of a competent overseer, to remove obſtructions and to keep the drains in perfect repair, and in eſtimating the drains he has increased the price per cubic yard in order to cover this expense. The next ſtep which he recommends, is, to form roads along the edges of the drains, sufficiently ſtrong to bear the weight of small carts; the superior advantage in this process to be derived from Mr. Edgeworth's plan of wooden moveable Railways, is, we think, very considerable. Mr. Richard Griffith junior next considers the quantity of manuring gravel which would be sufficient to cover an acre of Bog, in order to render it capable of producing a good crop of Rape, Potatoes or Oats, or rather a succession of those three crops, without any further addition of manure than the aſhes that would be produced by a light or a partial burning of the surface; he supposes that six loads to the perch of gravel (each load containing about seven hundred weight) would be amply sufficient to cover each acre, together with a slight top dressing of aſhes or (if more convenient) of quick lime, say one thousand loads, or three hundred and fifty tons of gravel to the acre, he calculates that upon a general average, each load could be laid on the Bog at an expense of about four pence per load, or £.16. 13. 4. per Iriſh acre, and the top dressing of cauſtic lime would coſt about £.6. per acre more, to which add the expense of planting and digging out an acre of potatoes, which he recommends as the firſt crop, £.10. He proposes a second crop of potatoes to follow the firſt, in which case the produce of the second year, he observes, will be found greatly superior to that of the firſt. The third year a crop of oats, and to lay down the land with hay-seed. For the fourth year meadow, without any additional expense. Mr. Richard Griffith junior adds, that if he is not greatly miſtaken, the Bog so treated would be completely reclaimed, and would, in its then ſtate, be well worth £.1. 10. per acre per annum.

There is however another rotation of crops, which he says he would prefer to the foregoing, and which is also frequently practised, with the exception however, that the large quantity of clay and gravel which he recommends, is seldom or ever afforded to the Bog in the firſt inſtance, and on which increased quantity he builds his expectation of perfect reclamation, by forming a solid upper ſtratum on the Bog, without which the plough can only operate at particular seasons; for this purpose he proposes, that after the one thousand loads of gravel, as above ſtated, ſhall have been laid out and spread, the whole ſhould be lightly ploughed, and after a slight top dressing of lime or of red aſhes, which latter may be easily produced by burning the surface of the neareſt black Bog, a crop of rape ſhould be sown, to be succeeded with one crop of drill potatoes, oats and meadow, and as soon as the hay ſhall be mowed, about two hundred and fifty loads of gravel or clay per acre ſhould be laid out and spread upon the surface; this process, he adds, would leave the land (for such it might be then called) in a ſtate of great power and vigour, and infinitely more profitable to the farmer for tillage, meadow or paſture, than moſt of the uplands in the neighbourhood. He is of opinion, that after the above process, including the second top dressing of gravel, the value of the Bog to the farmer would far exceed (although he ſtates it at no more than) £.1. 10. per Iriſh acre.

He next lays before us a Prospectus of the probable Expense of the two modes of cultivation above suggeſted, together with the annual Return to be expected from the several crops in the process of four years cultivation; and for the purpose of perspicuity, he makes his eſtimates upon a single average acre, and afterwards forms his conclusion upon the result of four hundred acres under similar treatment.

Firſt proposed rotation of Crops.

1ſt year - - - Potatoes.
2d d° - - - D°.
3d d° - - - Oats laid down with Hay-seed and white Clover.
4th d° - - - Meadow.

Second proposed rotation of Crops.

1ſt year - - - Rape.
2d d° - - - Potatoes in drills.
3d d° - - - Oats laid down with Hay-seed and white Clover.
4th d° - - - Meadow; immediately to be followed by a slight covering of gravel.

D^r and C^r on firſt proposed rotation of Crops.

D^r, or OUTLAY.

Firſt Year.	£. s. d.	£. s. d.
Putting out 1,000 loads (7 cwt. each load) of gravel per acre, at 4*d*. per load - - - - -	16 13 4	
Spreading the gravel - - - - - -	0 10 —	
Top dressing of lime - - - - - -	6 — —	
Carried forward - £.	3 4	

D^r, or Outlay—Firſt year—*continued.*	£.	s.	d.	£.	s.	d.
Brought forward	23	3	4			
Seed, eight barrels, at 5*s.* per barrel	2	—	—			
Planting, second covering, digging out and gathering	8	—	—			
per acre	33	3	4			
Add, Intereſt for nine months on £. 33. 3*s.* 4*d.* at 6 per cent. per annum	1	9	10			
				34	13	2
Second year.						
Seed-planting, second covering, digging and gathering, per acre	-	-	-	10	—	—
				44	13	2
Third year.						
Two ploughings and harrowings	2	—	—			
Harrowing with graſs harrows, and rolling after the sowing of the hay seed	—	15	—			
Seed Oats, 1 ½ barrel per acre, at 15*s.* per barrel	1	2	6			
Hay seed and white Clover :						
12 barrels of white Hay seed - - - £. 1 16 0						
12 lb. of red, and 4 lb. of white Clover - 1 2 9						
	2	18	9			
				6	16	3
Fourth year.						
Meadow - - - no expense.						
Total Expense of 4 years cultivation, per acre				51	9	5

C^r, or RETURN.						
Firſt year.						
60 barrels of Potatoes, at 5*s.* per barrel	15	—	—			
Second year.						
80 - - - D^o - - - at 5*s.* per barrel	20	—	—			
Third year.						
14 barrels of Oats, at 14*s.* per barrel	9	16	—			
Besides Straw, which pays for reaping, threſhing, &c. &c. &c.						
Fourth year.						
Meadow; the price at which it would set per acre	5	—	—			
Total Return from four years cultivation, per acre			£.	49	16	—
Total Loss on four years cultivation of Bog, per acre				1	13	5
			£.	51	9	5

After which the ground will set for at leaſt £. 1. 10. per acre per annum.

D^r and C^r on second rotation of Crops.

D^r, or OUTLAY.						
Firſt Year.						
Putting out 1,000 loads (7 cwt. each load) of gravel per acre, at 4*d.* per load	16	13	4			
Spreading D^o	—	10	—			
Lime or red aſhes	5	—	—			
Spreading the lime or aſhes	—	5	—			
One ploughing	—	18	—			
Rape seed and sowing	—	5	—			
Add, Intereſt on the above Outlay for 18 months, at 6 per cent. per annum	2	2	5			
				25	13	9
Carried forward	-	-	£.	25	13	9

				£.	s.	d.	£.	s.	d.
Dʳ, or Outlay—*continued.*									
Brought forward				-	-	-	25	13	9
Second year.									
Potatoes in drills				-	-	-			
Two ploughings and harrowings at and before sowing				2	—	—			
Drilling; dropping the sets, and covering the seeds				2	—	—			
Seed; six barrels to the acre, at 5*s.* per barrel				1	10	—			
Hoeing with the plough, and landing				1	—	—			
Ploughing out and picking				1	—	—			
Expense per acre				-	-	£.	7	10	—
Third year.									
Oats; the ground to be laid down with Hay seed and Clover, as in the firſt mode in the third year.									
Expense per acre				-	-	-	6	16	3
Meadow; after the Meadow is cut, I ſhould recommend about 250 loads of gravel per acre to be spread on the grass, to make up for the gravel consumed in the firſt turning				4	3	4			
Spreading and picking				—	10	—			
Expense per acre				-	-	£.	4	13	4
Total Expense of 4 years cultivation and improvement, per acre						£.	44	13	4
Cʳ, or RETURN.									
Produce of Firſt year.									
12 barrels of Rape seed, at 34*s.* per barrel, per acre	£.	20	8	0					
Deduct reaping and thraſhing		1	10	0					
				18	18	—			
Second year.									
80 barrels of Potatoes, at 5*s.* per barrel				20	—	—			
Third year.									
14 barrels of Oats, at 14*s.* per barrel				9	16	—			
Fourth year.									
Meadow; the price of which it would let				5	—	—			
Total Return from 4 years cultivation				-	-	£.	53	14	—
Deduct Total gain for 4 years cultivation of Bog, per acre							9	—	8
						£.	44	13	4

From the foregoing prospectus it would appear, that upon the second rotation of crops (which Mr. Richard Griffith junior considers to be the beſt for the ground) there would be a clear profit of £.9. 0. 8. per acre on the general result of four years cultivation and improvement, being nearly equal to two guineas per acre per annum; Mr. Richard Griffith junior adds, that fearful leſt he ſhould have drawn too flattering a picture of the undertaking, he has gone over every article in the foregoing Eſtimates, both of expense and produce, with some very experienced and discerning farmers, and has not been able, after a thorough inveſtigation, to correct them in any reſpect; as however it may be apprehended that in farming upon a large scale, the expense may be increased beyond the beſt considered eſtimate formed upon a small one, he therefore has thought it expedient to increase the amount of the Outlay, by an addition of 10 per cent. to the eſtimate, and to subtract 10 per cent. from the produce of the crops, as an allowance for partial failures arising from inclement seasons. And he says he feels satisfied that by so large an allowance (making on the whole concern a deduction of profit amounting to 20 per cent.) he has made ample provision for every possible contingency.

According to this Statement, the Account will ſtand thus:

	£.	s.	d.
To amount of Outlay on second rotation of Crops as per prospectus, per acre - - - - - - - - - -	44	13	4
Add 10 per cent. - - - - - - - - - -	4	9	4
Total Amount of Outlay - - £.	49	2	8
To amount of Return per acre, as per prospectus - - - -	53	14	—
Deduct 10 per cent. - - - - - - - -	5	7	5
Total amount of Return - - £.	48	6	7
Loss on 4 years cultivation - - - -	—	16	1
£.	49	2	8

From hence Mr. Richard Griffith junior observes, that on four years cultivation there will be a loss of 16*s.* 1*d.* per acre, to which muſt be added the expense of drainage; viz. £.1. 16. making a total loss of £.2. 12. 1. per acre, which would be the full purchase paid for bringing unprofitable red Bog to the value of at leaſt £.1. 10. per Iriſh acre, or 18*s.* 6*d.* per Engliſh acre per annum for ever. Let this eſtimate then be compared with the important object to be attained; viz. 400 acres of unprofitable red Bog converted into ground well worth £.1. 10. per acre per annum, and the final account will ſtand thus; viz. 400 acres at £.1. 10. per acre, amounting to £.600 per annum, eſtimated at 18 years purchase, makes - - - - - - - £.10,800 — —

Deduct £.2. 12. 1. per acre on 400 acres - -	1,041	13	4
Net Profit - -	£.9,758	6	8

Mr. Richard Griffith, junior, proceeds to give us his opinion on the applicability of Peat soils to white and green crops respectively, and observes, that there is a natural disposition in all plants towards particular soils, or in other words, that the food of certain plants is found more abundantly in one kind of soil than in another. From the observations he has made on the growth and perfection of different plants on boggy and moory soils, he is fully persuaded that they are infinitely better adapted to produce and mature green than white crops. The fineſt cabbages, turnips, carrots and parsnips, he has ever seen having been raised in gardens made in black Bog, with no other manure than a slight sprinkling of aſhes produced by burning part of the same soil, and potatoes, he says, have such an affinity (if the expression may be allowed) for Boggy soil, that farmers always prefer planting the seed that has been raised on Bog to any other, and frequently send to a considerable diſtance to obtain it; on the other hand he has found that although the crops of oats and wheat produced on peat soils have been sufficiently luxuriant, yet they have seldom yielded in proportion to their promise, the grain being neither so full nor so bright as that produced upon good upland. This circumſtance, however, he ſtates may have arisen in a great degree from the want of a sufficient admixture of limeſtone gravel, or other calcareous matter, a corrective always at hand in these Bogs, which, when applied in sufficient quantity, is invariably found to produce the moſt beneficial effects and *vice versâ*, as Bog ſtuff exposed for some months to the atmosphere, well turned, and mixed with common earth and a small portion of cauſtic lime, is found to be an excellent manure for worn-out upland. He further observes that were he to point out the moſt advantageous situation for a judicious and extensive farmer, he ſhould place him on the margin of a Bog, upon which he ſhould raise all his green crops, and the whole of the dung produced in the farm-yard by cattle fed on turnips, &c. might be applied to the improvement of the uplands, and he is fully persuaded (that if ever any extensive plan ſhall be put into operation for draining the Bogs) that not only the ſyſtem he has juſt now suggeſted will take place, but a very considerable traffic will arise in the manufacture and sale of aſhes, which will prove equally beneficial to the Bog improver and to the upland farmer.

He further ſtates, that the foregoing ſyſtem, although extremely profitable in the end, would, however, require a considerable capital to carry it into execution upon an extensive scale; and that it is almoſt unnecessary to observe, that the want of capital is the great obſtacle to the internal improvement of Ireland. It may not therefore, he says, be improper to suggeſt a mode of rendering the Bog when drained of considerable value, by a more simple and less expensive process.

If the surface of the drained Bog, he observes, be suffered to remain inactive for three or four years subsequent to the drainage, a thick crop of common heath will be found growing on its surface intermixed with grass. This heath, and the decomposed Boggy soil which is immediately below it, he proposes ſhould be ploughed up, gathered into rows, and burned, after which operation the surface of the Bog ſhould again be ploughed lightly, the aſhes spread, and rape seed sown; the rape ſhould not be suffered to go to seed, but ſhould be eaten off by ſheep. After light ploughing and harrowing, grass seeds might then be sown, which in the course of a year would become excellent food for sheep and young cattle, but meadow ſhould not be attempted. After a few years it may be expected that heath will again make its appearance, the process already described may then be again resorted to; viz. ploughing, burning, rape crop, grass, and the second crop of rape will be found to be greatly superior to the firſt. The expense of rendering the surface of the Bog valuable, by the means laſt described, he says will be trifling, and will be amply repaid by the value of the rape crop, and the Outlay will be returned in less than a year.

Mr. Richard Griffith junior says, that in the improvements already effected, rape appears to be the moſt favourite crop, at leaſt in the commencement, but oats, potatoes and rye, are found to answer nearly as well. He has seen wheat tried on the surface of very deep red Bog; the produce was tolerably good, but the grain was not full. Hemp had been tried by many persons with various success; when failures had occurred they were perhaps attributable more to ignorance of the mode of cultivation, and the proper methods of saving and drying, than to any imperfection in the peat soil. He observes that this plant likes a deep soil, but will not thrive in wet; unless therefore the Bog ſhall have been completely drained, the soil to some depth turned up and exposed to the atmosphere, and intermixed with limeſtone gravel, there can be little hope of obtaining a valuable crop; but with these precautions he thinks the beſt success may be expected.

Mr. Jones observes, that throughout the whole of his Diſtrict few attempts have been made towards the reclamation of any considerable part of the large tracts of Bog which it contains. The principal places that have been improved are at Toar, Middleton, Kilbresman, Tyrrell's Pass, and Killduff near Philipstown; the whole extent reclaimed does not exceed two hundred acres. He ſtates, that the mode usually pursued in the reclamation of such parts of Bogs as have come under his observation, was, after the space had been well drained, the surface in general was either pared off, or ploughed or dug up and thrown into heaps (if black Bog) through which a quantity of gravel or clay was mixed. These heaps were then fired, and the aſhes afterwards spread on the surface, and either dug or ploughed in. This produced an excellent crop of rape; crops of potatoes and oats succeeded this, after which it was generally laid down with grass seed, and by the application of such manures as were moſt convenient, produced very good crops of meadow. He observes, that in spongy red Bogs, the process of burning is not usually pursued; the surface when dry being so light that little aſhes (and those of inferior quality) would be produced. Marle in this inſtance (if to be had) is the beſt manure that can be applied to the surface, a thin layer of which would be sufficient to produce potatoes, oats, flax, &c. in succession.

Mr. Edgeworth ſtates an experiment made by himself some years ago upon Bog that had been only partially drained, whereby it appears, that by the application of lime, limeſtone gravel and marle, in the courſe of 5 years cultivation, he brought 27 acres of Bog, which when firſt taken in hand was not deemed worth half a guinea per acre, to be worth and actually let for £.1. 10. per acre per annum. He ſtates, that during the 5 years proceſs of cultivation, he had charged himſelf with half a guinea per acre per annum rent, and that by an accurate account of the tranſaction now in his poſſeſſion, it appears that he had never had £.100. capital employed therein. That after having his capital reimburſed, and after the payment of rent and every contingent expenſe, including wear and tear of the implements of huſbandry and overſeers wages, he had at the end gained £.17. clear profit; and at that period, when the land was in meadow he had let it to a farmer (who had formerly refuſed to take it at half a guinea) at 30 ſhillings per acre per annum for the farmer's own life, and he ſtates that it is now worth nearly double that rent.

The obſervations ſuggeſted by Mr. Edgeworth in the reclamation and improvement of Bog, and the proceſs recommended by him to be purſued therein, are as follow: In the firſt place, he propoſes to cut off all the ſprings and ſloughs by appropriate drains, and then wherever a Bog, as that denominated No. 8. in his Diſtrict, is covered with heath or weak plants of any other ſort, he adviſes the burning off the rough ſurface in a dry ſummer, merely by ſetting fire to the heath, and permitting the fire to ſpread itſelf wherever it may meet with fuel. In other Bogs, where the roots of plants are ſtrong and deeply ſunk under the ſurface, he would immediately proceed to turn up the whole of the Bog with grubbing tools, and particularly with a long loy, a tool which is common in the weſtern part of Ireland. As he advanced, he would cut narrow drains of 18 inches deep with Eſſex draining tools, *wherever* water lodged on the ſurface, and drains of fit dimenſions wherever ſprings occurred, not previouſly diſcovered. The thick tough ſurface of the Bog ſhould then be piled up in ridges to dry, and where the turf ſo dried yielded aſhes that contained manure, as much of it as is poſſible ſhould be burned in the rows as they ſtand, to ſave the expenſe of making it into heaps. What remains unburned after this attempt ſhould be collected in heaps, and burned to aſhes. The next operation is to put out ſome kind of clay upon the aſhes after they have been ſpread, taking care ſoon to cover them with earth, to prevent them from being blown away.

Mr. Edgeworth does not approve of a ſyſtem of navigable drains, for the tranſportation of the proper manures into the Bogs, but propoſes to employ for this purpoſe portable Railways ſhod with iron, with appropriate carriages, the latter are made to be emptied at either ſide of the railway, and when loaded with half a ton of earth, one of them can eaſily be puſhed forward by one man; Mr. Edgeworth ſays he ſhewed a railway conſtructed upon the above plan to ſeveral of his friends in 1787. The advantages propoſed by this conſtruction, were, to extend the uſe of railways to temporary purpoſes, and to reduce the expenſe conſiderably, by dividing into ſeveral parts the weight which is uſually loaded on one carriage, ſo that the railway might be reduced in weight and coſt, without being more liable to break than thoſe that are in common uſe. Mr. Edgeworth adds, that this plan has been adopted in many places, particularly at Penhryn slate quarry in Wales, where a number of ſmall carriages loaded lightly ſupply the place of one larger carriage; by theſe means, railways may now be made ſufficiently ſtrong, though not one-fourth part of the weight or coſt of ordinary railways. Mr. Edgeworth propoſes that theſe portable railways ſhould be ſupported on piles of five or ſix feet long driven into the Bog; and that they ſhould be removed from place to place, ſo that after a ſeries of railways had been laid to the diſtance of half a mile for inſtance, and after the carriage had emptied its loads on each ſide of it, the railway may be detached and placed at the diſtance of two perches parallel to its former ſituation. We conſider the ſuggeſtions of theſe railways as one of great utility, and which it will probably be found may be adopted with great advantage in the plans recommended by the other Engineers. The Plans and Eſtimates for their conſtruction may be found in the Appendix to Mr. Edgeworth's Report, N° 4. By this it appears, that the proportion per acre of the capital of £. 500. to be expended in making the railways and carriages, would on 1,200 acres amount to about five ſhillings per acre; wear and tear about three ſhillings more; gravelling and removing machinery about 10 ſhillings. Mr. Edgeworth next obſerves, that this Eſtimate is made on the supposition, that the machines and railways would laſt 4 or 5 years, the time necessary for completing the improvement of 1,200 acres, so as to make the land worth 30 *s.* per acre, the expense of the whole, Mr. Edgeworth thinks would be nearly as follows:

	£.	*s.*	*d.*
Wear and Tear, and ſhare of capital, per acre	—	8	—
Draining	—	10	—
Turning up surface	2	13	—
Digging and filling clay	2	13	—
Carrying out clay on moveable railway	1	14	—
Spreading clay and ſhifting the railway	—	10	—
Damages for gravel-pit	—	7	—
	£. 8	15	—

Equal to *£.* 5. Engliſh, per Engliſh acre.

To improve the Bogs of the whole Diſtrict, amounting to 34,569 Engliſh acres, would, according to this Eſtimate, coſt *£.* 167,648 Engliſh. Thus a permanent income of nearly *£.* 30,000. Engliſh could, he says, be obtained at less than ſix years purchase.

Mr. Edgeworth considers the plan that is here recommended as the firſt ſtage of improvement, and believes that it would make the Bog worth 25 or 30 ſhillings per acre, and he adds, that ſubſtantial and intelligent farmers would, for half as much more, double its value; but that poor tenants, if they were allowed to have more than a garden, and as much land as would support a cow with grass and hay, would soon wear out what had been done. Reclaimed Bog, he says, muſt be continually attended to; and if peat that will afford red aſhes is to be found below the surface, and lime in any form be within reach, the Bog may be made worth four pounds per acre.

Mr. Longfield commences his observations on the improvement of Bogs, by ſtating, that in his diſtrict he has found good manuring gravel, sufficiently near the surface, to be raised without incurring much expense or trouble, and has accordingly noticed them on the Map, and would recommend, when sush cases occur, that the ſtuff ſhould be raised to the surface; but when the manures cannot be had nearer than 8 or 10 feet, he would not advise any attempt to diffuse their benefits.

He observes, that the different lines of drainage which he had recommended would be sufficient to reduce the surface of the Bog to a ſtate of consolidation; but that this would not be sufficient alone to produce vegetation; the aid of manures is indispensable. On Moors and black Bog, the want of compoſt or manuring gravel would not be so severely felt, as that description of Bog produces ſtrong aſhes, by means of which the landlords are enabled to raise profitable crops of rape, potatoes, &c. &c. But as this species of manure is unattainable in the ſhaking or red Bogs, methods muſt be devised either to raise the under ſtrata to the surface, or to convey into the interior such gravel or manures as the surrounding country affords; this laſt resource, with a few exceptions, is in Mr. Longfield's opinion the moſt practicable, and even this cannot, he thinks, be carried into effect without considerable labour and expense. However, the magnitude of the undertaking, and the benefits likely to result from it, have induced him to take advantage of the natural capability of the country, in affording means of conveying manuring gravel to the interior of the Bogs by the aid of navigable cuts; and therefore wherever gravel may be had with a supply of water to command the summit of the Bog, Mr. Longfield has, in laying out the main drains, kept in view the further object of converting them into future lines of navigation, applicable, however, only to such purposes.

Mr. Longfield further observes, that the Bog ſtuff raised in excavating for the navigable drains might be converted to profitable purposes, it might be brought to the Bog edges in the boats returning for a supply of gravel, and drawn from thence upon the uplands; he has seen the beſt crops in the country produced on light gravelly soils by this means only, and he is assured by gentlemen of respectability, that this species of manure is so valuable and certain in its effects, that it is generally used upon the uplands, not only bordering on the Bogs, but frequently at a diſtance of half a mile and more, until the carriage, according to the present mode, becomes more expensive than the species of return would compensate; and he ſtates that the value of Bog ſtuff is further exemplified in the interior of the country, by the care with which the turf mould at the bottom of the turf ſtacks is collected and spread upon the land with a small portion of lime or clay mixed with it. This compoſt is used with success in rearing garden ſtuff, such as cabbages, carrots, parsnips, &c. &c. And he is convinced that if the inhabitants of the country were induced, when going for the Bog ſtuff, to bring a load of gravel with them, they might thereby have reclaimed many hundred acres round the verge of these Bogs, which, lying immediately adjoining the natural tops of the country, did not require a preparation of expensive drainage.

Mr. Longfield says, that the erection of locks in these deep Bogs, is, in his opinion, entirely out of the queſtion (where it is necessary to convey the manure from a higher to a lower level, he thinks we muſt be content with landing-places in proper situations, by means of which, a load of gravel may be transferred from the boat on the higher level, to the boat on the lower one), which in moſt cases will not be found necessary, as either levels will generally commence or terminate in manuring gravels. He says, by these means manures can be diffused over the surface at a reasonable expense, when compared with that of horse work. Mr. Longfield ſtates, that the quantity of surface which may thus be brought into cultivation will be great; for supposing that the operations of men with wheel-barrows, &c. cannot be extended more than 40 perches from the verge of the Canal on both sides, yet the quantity brought into improvement will be 160 Iriſh plantation acres, equal to 240 Engliſh acres in every Iriſh mile of navigation. The fee of which 160 acres, at the reasonable rate of 30 ſhillings per acre, at 5 per cent. would amount to £.4,800. on the preſumption that the effects of the navigable drains were confined to within 40 perches on both ſides, but which can never be the case, when it is considered that their influence, combined with the surface drains muſt extend much further, by means of which the gravel can be conveyed by cattle, either by back loads, or on sledges drawn over the paſtures already formed by the labour of men only.

It is scarcely necessary for us to observe how useful an auxiliary to this system, Mr. Longfield would find in Mr. Edgeworth's plan of moveable railways.

The dimensions which Mr. Longfield proposes for those canal drains are fourteen feet at bottom, and to contain four feet depth of water; the boats to be flat bottomed, and calculated to contain from fifteen to twenty tons, they would then be easily removed from place to place by one or two men. He says, that a navigation of this size, where no great surge of water would be occasioned to injure the sides, would keep in repair a considerable time, the advantages of which he calculates to out balance any other mode whatsoever. To facilitate the object and save expense, he observes, there may be occasions for a few Bridges over the navigable drains, which can be made of Bog timber; all other passages over the main drains may be reserved, by only perforating the bottom, and leaving the surface untouched, as already alluded to in the small surface drains.

He observes on the subject of improvements already effected, that the black and red Bogs held by Mr. Sadlier under Lord Digby, containing about 343 acres, being moſt judiciously intersected with main and cross drains (on a small scale), are now for the moſt part in a perfect and profitable ſtate of agriculture, so much so that a great portion of those Bogs, which when taken by Mr. Sadlier, were not worth five ſhillings per acre, would now produce from thirty to forty ſhillings the Iriſh acre. Mr. Longfield ſtates, that the progress of this improvement consiſted chiefly in draining, levelling and burning, by which means Mr. Sadlier has been enabled to rear abundant crops of rape, on an average from seven to ten barrels per acre, which, at the moderate rate of one guinea and a half per barrel, muſt have amply repaid his expenses, independant of creating a valuable and laſting property, which he now enjoys; Mr. Longfield also mentions the successful endeavours of Mr. Curtis, in reducing to a ſtate of consolidation, a large portion of red and black Bogs, little less than 150 acres, a great part of which has been brought into cultivation within the laſt 15 years, and which at this moment are actually under sheep, and the remainder ready to receive any agricultural improvement.

Mr. Longfield says, that conſiderable improvements have been effected by Mr. Armſtrong at Balever, Mr. Berry of Cloneen, and Mr. Woods of Garbally, which latter gentleman's improvements are by much the moſt extenſive, amounting to near 240 acres, which being favourably interſperſed with gravel hills, were more readily brought into cultivation. Theſe, with their other natural capabilities, have been taken advantage of by Mr. Woods, who has now the chief part of his Bog in a moſt promiſing ſtate of improvement. Much credit is alſo due to Mr. Berry for his exertion and perſeverance in tapping the Bog of Cloneen, by which he has completely drained ſeveral ſtanding pools that contained from three to five feet water. He has alſo made ſome ſkreen plantations on the Bog that appear very healthy.

Mr. Longfield ſtates, that in the middle of the Bog of Derrinlough, on the ſide of the road between Crankree bridge and Derrinlough, there is a remarkable inſtance of the poſſibility of changing the nature of actual red Bog from an unprofitable to a profitable ſtate; it conſiſts of a few perches, which, as far as Mr. Longfield could learn, had been cultivated by a poor man 11 or 12 years ago, and which (contrary to the received opinion, that Bog will revert to its original ſtate of nature) actually produces good paſture to this day, although deſerted and left in common with the reſt of the Bog ſince the improver's death, notwithſtanding the peculiar diſadvantages of the place being above a quarter of a mile diſtant from the main land.

Mr. Townſhend obſerves, that the whole of his diſtrict abounds in limeſtone gravel, and that the navigable drains propoſed by him will afford the eaſieſt conveyance poſſible; they are in many inſtances directed to the foot of ſteep gravel hills of from 50 to 80 feet in height, and of an inferior quality of ground, in order that a ſufficiency may be procured with the leaſt poſſible injury to the adjoining lands. One acre, he obſerves, of a gravel hill 50 feet in height, will cover 600 acres of Bog one inch thick, and ſo in proportion. Taking the gravel hills at an average of only 30 feet in height, which is a low calculation, the one acre will cover 360 acres of Bog one inch thick; and ſuppoſing the broken ground to be afterwards totally uſeleſs, the purchaſe of an acre could not exceed £.36. which would amount to 2 ſhillings per acre on the ſurface of the Bog for damages of the ground from whence the limeſtone gravel is to be procured.

The plan which Mr. Townſhend recommends for bringing the gravel into the Bogs, is to have flat-bottomed boats, with a platform even with the gunnel, and a double railway upon it, calculated for two rows of waggons or carriages to be conſtructed for the purpoſe, and over this, if neceſſary, another platform may be erected with a ſingle railway upon it, having ſufficient headway for the lower tier; a ſheet caſt iron railway to be laid on the ground between the gravel hill and the boat, for the waggons to run on, and when as many are placed on the boat as the railway on the platform will contain, two men will take the boat along the drains into the Bog, and then to have another railway, not exceeding 40 perches (280 yards) to run the waggons from the boat to any part of the ſurface; then to tilt them, and return with them empty, and as ſoon as they are all replaced on the boat, to return with it to the gravel hill, and repeat their operations.

Mr. Townſhend further obſerves, that caſt iron railways and waggons could be very advantageouſly uſed along the exterior edges of the Bog where gravel hills are convenient, and alſo in the ſmall detached Bogs and other places that cannot be accommodated with a navigable drainage and boats.

Mr. Townſhend obſerves, that the facility with which gravel can at any time be brought in by boats, renders it unneceſſary to lay on more in the firſt inſtance than is really required to produce one crop, then to go on progreſſively increaſing the quantity with each ſucceeding crop, until the Bogs are gravelled completely to any thickneſs, and they will become profitable from the firſt commencement of the buſineſs, inſtead of having to wait for the full quota of gravel before the crops are put down, and will not require ſo large a ſum to be laid out at the firſt onset; Mr. Townshend has calculated one inch only of gravel as being ſufficient to produce a succession of crops, but not for a permanency; the quantity per acre will be nearly 218 cubic yards, which, at the rate of 6*d.* per yard for excavating and removing by boats, will amount to £.5. 9*s.* per acre.

He alſo ſtates, that the value of the Bog when drained and gravelled, provided it be properly done, will be nearly equal to that of the adjoining lands; and theſe in general may be averaged at upwards of two guineas per acre per annum; the Bogs therefore, when improved in the manner before-mentioned, with the advantages alſo of a canal conveyance to every part, he thinks may fairly be eſtimated worth 30 ſhillings per acre yearly value at the leaſt.

Mr. Townshend then proceeds to make the following Abſtract of his calculations. "The aggregate expense of draining and improving all the Bogs in this Diſtrict, including navigable drains, and opening a communication with the neighbouring country, will be as follows; viz.

	£.	s.	d.	
The navigable drains - - - - - -	3	—	2	
Masonry on D° with inclined planes on the collateral cuts - - - - - -	—	17	7	
Gravelling the Bogs 1 inch deep - - -	5	9	—	
Drainage to lands - - - - - -	—	2	—	
	£. 9	8	9	per Iriſh acre.
Which is equal to -	£. 5	16	$5\frac{3}{4}$	per Engliſh acre.

Mr. Townshend goes on to ſtate, that when once the drains are made in the manner before-mentioned, any future improvements on extensive tracts of Bog can be done much cheaper than by any other plan; and those persons who undertake to reclaim and cultivate them may very well afford to pay, by an acreable rent, for the convenience of navigation, from which they will receive so much benefit.

Mr. Townshend mentions a fact which may be worthy of notice in respect to the reclamation of red Bog; he says, that a considerable part of the Bog of Bunnahendley, which extends nearly to the town of Athlone along the banks of the Shannon, and whose depth is from 23 to 33 feet, with a gradual descent from the surface of the Bog to the River, has by degrees been reclaimed; and it appears at the time of the Down survey, that this Bog contained 1,173 acres; it is at present no more than 666 acres, a considerable extent of the red Bog having been improved.

With respect to the advantages of irrigation in the reclamation of Bog, we observe, that Mr. Edgeworth, Mr. Longfield, and Mr. Davy, all lay great ſtress on its beneficial effects; when it can be obtained from external rivers, there can be no doubt, but we think it highly material to observe, that the penning up the Bog water in the drains, and suffering it to spread over the surface of the Bog, may probably be found to produce widely different effects, as the Bog water is known to contain peculiar properties, which may be found injurious to vegetation.

As a practical proof of its efficacy, he adduces the inſtance of the river Clodagh, a conſtant ſtream running from the Slieve Bloom Mountains, and carrying with it quantities of fine sand and clay, which it deposits along its course. The effect of the sand thus deposited on the Bog is such, that the verges of it, which have been annually flooded for ages paſt, are now become good meadow, paſture and tillage, on sand and clay, under which there are in many places from 10 to 12 feet of Bog. He also ſtates another fact, which proves, that these profitable verges have been made so by the effects of the Clodagh; namely, that the bed of the river itself reſts on Bog of from 8 to 10 feet deep; this he has proved by boring in the centre of it, where, after passing through a ſtratum of gravel of 2 feet, he found a ſtratum of Bog 10 feet deep, which he thinks proves that the present course of the River is new, and that it muſt have been diverted into its present course since the formation of the Bog; for these reasons, Mr. Longfield recommends taking in a supply of water from the Clodagh, to be used at all seasons if necessary.

The sub-ſtrata of all these Bogs, Mr. Longfield says, appear to be a solid mass of clay mixed with limeſtone gravel, the latter not unfrequently covered with a thin ſtratum of clay or marle; but however desireable it may at firſt appear that manures ſhould be found under the surface of the Bog, which they are fitted to reclaim, the depth at which they lie will in moſt inſtances render this circumſtance of little moment; fortunately, however, the boundaries of almoſt all these Bogs conſiſt of hills of limeſtone gravel, as also generally the islands which rise in so many places through their surface. In our laſt Report we observed, that there was no spot, on the whole extent of these Bogs, above two Iriſh miles from the upland and cultivated diſtricts; this is a circumſtance of great moment when we consider, that these boundaries generally present the manure that can be desired. It muſt not however be supposed that it will often be necessary to bring the manure from so great a diſtance; for it is a singular fact, that owing to the indented and irregular figures of these Bogs, at leaſt 4-5ths of their superficial extent is within half an Iriſh mile of the dry land which forms their respective boundaries, or the islands that they contain.

Planting.

ON this branch of the subject, Mr. Richard Griffith junior observes, that the antiseptic quality, so universally found in Bogs, muſt effectually prevent the growth of all plants that ſtrike deep in ground, or depend for subsiſtence on a top root; we muſt not therefore, he thinks, expect to find the oak thrive upon deep Bogs. He ſtates, that it will be advisable, previously to the planting of any trees upon Bog, to deſtroy this quality (so inimical to vegetation) either by exposure to the atmosphere, or by the admixture of lime, limeſtone, gravel, or other calcareous matter, the soil being turned up after drainage (which muſt be the firſt ſtep towards every improvement on Bog) for 2 or 3 feet in depth, and exposed to the influence of the atmosphere, then mixed with a portion of limeſtone gravel, the success of the plantation, he observes, would be scarcely doubtful. The Scotch fir in his opinion, grows better than any other tree on red Bog; he mentions, that he found growing in one of the wetteſt quagmires of the Bog of Portarlington, an ancient fir tree of considerable magnitude; the Bog in this place was 19 feet deep, the tree had spread its roots horizontally to a very great diſtance around, and within the limits of these roots the Bog was perfectly dry, when at a very small diſtance beyond them it was so wet as to render the walking on it without the assiſtance of planks nearly impracticable. He ſtates, that larch grows vigorously on ſhallow black Bog, and entertains no doubt that larch and every species of fir, as well as birch, alder, and aſh, would grow vigorously upon Bog, if the process above recommended were adopted.

Upon the subject of planting on Bog, Mr. Edgeworth observes, that many Bogs after they have been drained to a certain degree, are capable of being planted without any further care than to dig up and break the surface round each plant, but that wherever water settles after the trees are planted, it muſt of course be drawn off. He ſtates, that in the Bog, No. 5, in his diſtrict, the growth of the Bog myrtle, and of some trees that had been planted on the border of the Bog, made him point it out in the Appendix, No: 5, as a proper place for an experiment upon planting Bog, without firſt claying and breaking it up. Among the young trees that he saw thriving on this Bog, he was surprized to find some vigorous larch; he has since seen in Bogs in the Queen's County, other inſtances of thriving larch. He does not recollect to have seen oak growing on Bog far from its edges; and he has been told by a gentleman of observation, that the roots of no trees can live in the lower part of deep Bogs; his own experience on this subject is but limited. He has seen large and ſtrong Scotch fir in deep Bogs, and some good alder; but he has reason to believe, that common osiers do not grow well in such soil.

Mr. Longfield observes, that in treating of improvements upon such extensive tracts of plain surface, he conceives it to be of the higheſt importance to take into consideration the moſt efficient way of providing ſhelter; for this purpose, he propoſes to interſect the Bogs with belts of ſkreen planting in ſuch proportions as local circumſtances render neceſsary, always keeping in view to break the effects of the prevailing weſterly winds. The object of ſhelter would not only thereby be obtained in a few years, but alſo a profitable growth of timber, which would contribute to repay the expenſe of draining, &c. The deſcription of trees which Mr. Longfield obſerved to thrive beſt on Bogs are firs, alders, birch, ſally, a good ſpecimen of which may be ſeen at the Earl of Charleville's, Mr. Curtis's, &c.

There are many plantations lately made, particularly on Lord Charleville's part of the Bog, which are in a thriving ſtate, both on the verge, and in the deep red Bog near the Glaſh bridge; this part, which he is certain was not leſs than from 10 to 15 feet deep, when the improvements were commenced about 18 or 20 years ago, is now covered with trees of different deſcriptions, chiefly firs, many of which would ſquare from 6 to 9 inches; and his Lordſhip aſſured him, that they were planted in the actual red Bog, without any compoſt, or earth-balls, which might be preſumed neceſsary for Bog plantations.

He reports another circumſtance that may be ſufficient to remove any doubt as to the practicability of covering a great part of theſe tracts with plantations; he ſtates, that the trees he has juſt mentioned, planted by Lord Charleville, are actually growing within a few feet of the depth of the ancient timber produced by the ſame Bog, and which is now ſeveral feet under the preſent ſurface, the ſtumps and roots however may be ſeen in the ſide of the plantation ditch, and many of them were neceſſarily cut away, and raiſed in making the drain on each ſide of the road where their roots appear conſiderably above the under ſtrata, which proves that this ancient timber muſt have grown on a ſtratum of Bog, without receiving any nouriſhment from the clay and gravel.

The only improvements in the way of plantation, mentioned by Mr. Townshend to have been actually effected in his diſtrict (except that on the Bog of Bunnahindly near Athlone, already ſtated, are the plantations of fir made by Mr. Holmes of Mount Proſpect, on parts of the Bog adjoining his eſtate; and Mr. Townſhend adds, that this gentleman has made drains on the ſurface of a large tract of Bog, with an intention of planting and improving it.

Mr. Adamſon has alſo planted fir trees, and made ſurface drains on a part of his Bog near Corr.

Mr. Jones ſays, that the trees uſually planted in ſuch parts of the Bog in his diſtrict as have been improved, are, Scotch fir, ſpruce, larch, alder and birch, all of which ſeem to thrive well.

We have now only to ſtate the expenſe at which each Engineer has eſtimated the execution of the works which he propoſes in his diſtrict, the coſts of a firſt improvement of the Bogs, and ſuch as will place them in a ſtate of profitable agriculture.

Mr. Richard Griffith junior, calculates the expenſe of drainage at £. 1. 16 *s.* per acre; and after entering into detail of the Outlay and Return, from a courſe of four years progreſſive improvement and cultivation, he ſtates the ultimate loſs thereon at 16 *s.* 1 *d.* per acre; which, together with £. 1. 16 *s.* per acre for drainage, amounts to £. 2. 12 *s* 1 *d.* per acre, being the total expenſe to be incurred, in order to bring red Bog to the value of £. 1. 10 *s.* per acre per annum.

Mr. Edgeworth calculates the expenſe of drainage at ten ſhillings Iriſh per Iriſh acre, which for 21,367 acres, the extent of the Bogs in his diſtrict, amounts to £. 10,683. 10 *s.* Iriſh; the expenſe of turning up and burning the ſurface, and of laying out clay and gravel by means of his portable railways he eſtimates at £. 8. 5 *s* per acre, including all charges; thus according to his plan, the total expenſe for draining and reclaiming Bog, will be £. 8. 15 *s.* Iriſh, per Iriſh acre; and conſequently to improve the Bogs of his diſtrict. viz. 21,367 Iriſh acres, would, according to his eſtimate, coſt £. 181,619. Iriſh, equal to £. 167,648. Engliſh, for 34,569 Engliſh acres.

By ſuch improvement Mr. Edgeworth aſſerts the land will become worth 30 ſhillings per acre, giving a permanent income of nearly £. 30,000. Engliſh for leſs than ſix years purchaſe.

Mr. Longfield reports that the Bogs in his diſtrict amount to 44,591 Engliſh acres, the expenſe of draining which he eſtimates at £.87,233. being rather leſs than two pounds per acre. He has not given a ſpecific eſtimate of the coſt of laying out manure or gravel.

Mr. Townſhend eſtimates that the expenſe of drainage in his diſtrict (the Bogs of which contain 21,298 Iriſh, or 34,500 Engliſh acres, will amount to £.63,435. He has added a further eſtimate of £.18,530 for maſonry in the propoſed drains, and of £.8,000. for Locks, in caſe of the conſtruction of navigable Canals of large dimenſions; but theſe latter ſums for the preſent, we put out of conſideration, having already ſtated our opinion on the ſubject of extenſive Canals in the Bogs; conſidering the expenſe of excavating his drains alone,

	£.	s.	d.
(which however it muſt be obſerved, are of greater dimenſions than we think neceſſary) the expenſe per Iriſh acre for drainage, will be -	3	—	2
The expenſe of gravelling and other charges of reclamation, he ſtates per Iriſh acre, at - - - - - - - -	5	11	—
The total expenſe therefore of reclaiming Bog will be, according to Mr. Townſhend's calculation, per Iriſh acre - - - -	£.8	11	2

And the total expenſe of reclaiming the 21,298 Iriſh acres of Bog in his diſtrict, will be £.182,275. 7. 8. Theſe Bogs he calculates will then be worth 30 ſhillings per acre, and thus an income of £.31,947. will be gained at leſs than ſix years purchaſe.

Mr. Jones's diſtrict contains 42,370 Engliſh acres, the expenſe of draining which he eſtimates at £.75,065, being at the rate of £.1. 15. 5. per Engliſh acre, nearly.

He has not given us any information as to the expenſe of any further proceſs in the reclamation of Bogs, nor as to the profit which would be derived from it.

The opinion in our former Report, ſhewing how unfounded were the apprehenſions of thoſe who conceived that the ſupply of fuel would be diminiſhed by the drainage of the Bogs, has acquired additional ſtrength as we obtained additional information, and we do not think that there exiſts the ſlighteſt cauſe for apprehenſion upon this head; on the contrary, there can be no doubt that the ſupply of fuel will be thereby conſiderably increaſed.

In our firſt Report we ſubmitted a detailed Statement of our Expenditure in two Accounts, forming the 2d and 3d article of its Appendix; commencing with the 19th September 1809, the day on which we held our firſt meeting, and ending with the 15th April 1810. As the forms of theſe Accounts were preſcribed by orders of your Honourable Houſe, we have thought it right to adopt them alſo in the preſent inſtance, and we have accordingly carried on theſe Accounts under the ſame headings, from the 15th April 1810, to the 5th January 1811, and have ſubjoined them as the 2d and 3d articles of the Appendix to this Report.

From theſe and the former Accounts, the nature of our expenditure is ſhewn in the utmoſt detail. We ſhall here obſerve in general, that our total Expenditure during the year, from the 5th January 1810, till the 5th January 1811, may be claſſed as follows.

	£.	s.	d.
1. Salary of our Secretary and one Clerk, being the entire expenſe of our Eſtabliſhment - - - - - -	256	17	6
2. Salary and travelling allowances of (9) Engineers - -	4,311	2	9
3. Ditto - - - - - - - - - of Surveyors - - -	4,198	7	10½
4. Pay of ſtaffmen, chainmen, and labourers - - -	2,030	2	11½
5. Implements and contingent expenſes for Engineers - -	85	11	7½
6. Miſcellaneous payments - - - - - -	129	17	11
Total - - £.	11,012	—	7½

It muſt not however be supposed that the total expenditure has been incurred upon the diſtricts which form the subject of this and of our former Report.

The surveys of three other diſtricts, Mr. Aher's, Mr. Brassington's, and Mr. Colbourne's, are completed, Mr. Longfield has also made considerable progress in his second diſtrict, and Mr. Richard Griffith junior has completed the greater part of another very extensive diſtrict, being the third which we have committed to his charge.

We think it necessary also to observe, in making any comparison of the work which has been done with the money which has been expended, and in juſtice to the Gentlemen whom we have employed, that the Engravings annexed to this Report can give no adequate idea of the degree of care and accuracy with which the documents in our possession have been executed. The original maps furniſhed to us by our Engineers, and which are on a scale which precludes their being engraved, whether considered as works of science or of art, reflect the higheſt credit on the Gentlemen who have been employed on them; and while they form in themselves moſt valuable working plans for any operations that may hereafter be undertaken, contain also such accurate delineations of the diſtricts which they embrace, as will furniſh the moſt authentic materials for any future map of Ireland. They are accompanied further with above a thousand miles of sections, drawn on the large working scale, ſhewing not merely the depths of these Bogs, and the nature of the under ſtrata, but marking also the precise height of every spot of their respective surfaces within the lines of section, above a line which we have marked on the mole in the Bay of Dublin, as the ordinary level of high water mark; we believe that there does not exiſt a similar *map of the levels* of any other country, a work which muſt be of great importance in determining the lines of any internal navigation which may in future be adopted.

We have found it impossible to complete our survey within the time prescribed for the duration of our commission; we have employed every Engineer we could find in Ireland who would enter into our engagements, and of whose qualifications we approved. We have endeavoured to procure others from England and Scotland, but without success, upon the present rate of our allowances; a proof, we conceive, at leaſt of the attention to economy with which they were determined on, and in which we ſhould not feel to have been juſtified, if we had obtained less satisfactory Reports from the Gentlemen who have given us their assiſtance.

If it ſhould be the wiſh of the Legislature that this Survey ſhould be continued, an additional grant of Money, and an Act of Parliament to extend the duration of our Commission will be necessary. The sum remaining in our hands is £.2,338. 11. 1. Without a material addition to that sum, the surveys of the Diſtricts beyond the Shannon, now in great forwardness, cannot be completed, and moſt of the expense already incurred upon them, will have been loſt; we are not yet able accurately to eſtimate either the money or the time which the completion of the Survey of all the Bogs of Ireland would require, but we are inclined to believe that the labours of another year from the expiration of our Commission, and the expenditure of a further sum of eleven or twelve thousand pounds, although they would certainly not see the taſk completed, would yet not leave much to be desired.

Dated this
8th day of March 1811.

J. LESLIE FOSTER. (L. S.)
HANS BLACKWOOD. (L. S.)
WILLIAM GORE. (L. S.)
RICHARD GRIFFITH. (L. S.)
HENRY HAMILTON. (L. S.)

APPENDIX.

Appendix, No. 1.

INSTRUCTIONS of the COMMISSIONERS to their ENGINEERS.

THE Secretary of the Commissioners appointed to enquire into the nature and extent of the several Bogs in Ireland, and the practicability of draining and cultivating them, is directed by the Board to communicate, for the information of the Engineers who may be employed, and of the proprietors of Bogs, the mode in which they have been advised to proceed.

1st.—They propose to divide the Bogs of Ireland into Districts, and to assign each District in charge to one or more Engineers.

2d.—Each of the Engineers is to provide a sufficient number of Assistants, for whose qualifications he is to be responsible.

3d.—The Commissioners think it necessary to direct the attention of their Engineers to the particular heads of Inquiry contained in these Instructions; but it is by no means intended to confine their judgment within these limits; on the contrary, where local circumstances point out a preferable mode of proceeding, the Commissioners expect that it shall be fully stated, in addition to the information on the different points which they now suggest.

4th.—They conceive, that the first steps towards the drainage of an extensive Bog should be to ascertain the proper lines of direction for one or more main Drains passing through it, to give vent to the waters which it contains, and for Catch-water Drains laid out along its edges, to intercept the springs and streams which flow into it from the adjoining lands.

5th.—In laying down the situation of the main Drains, the Engineers are to consider, not merely the general declination of the Bog towards the rivers, or such other natural out-lets as may best answer for their drainage, but to keep in view the further object, where practicable, of converting these main Drains, either immediately or ultimately, into channels of navigation, for the conveyance of the future productions of the Bog, and of providing for the connexion of those navigable Drains, where convenient, with the great lines of navigation already subsisting: where this is not possible, they are to consider how these different Drains may be united to other Canals, which may be formed hereafter. In laying down the situation of any navigable Drain the Engineers are to attend to the situation of such manuics as may be most suitable for the Bog.

6th.—Where the main Drains are likely to be used as Canals, they are not in any instance to be less than 14 feet broad at bottom, and five feet deep from the water surface. The breadth and depth of other main Drains, and of the Catch-water Drains, must be proportioned to the quantity of water which they are to discharge.

7th.—As there are no districts which are more liable to the inconvenience of a total want of water in dry summers, than level tracts of marshy ground, when once their drainage is effected, care must be taken in laying down the direction of the main Drains to allow them, where practicable, to be occasionally dammed up, so as to raise the water within two feet of the surface, for the purpose of promoting vegetation; and that the Catch-water Drains in like manner should supply water on the surface, for the use of cattle, or for the purpose of irrigation, where that mode of improvement shall be deemed advisable; and in situations where a sufficient supply cannot be procured by these means, the Engineers are to consider where reservoirs may be most advantageously constructed, to be supplied, in time of flood, from the Catch-water Drains or rivulets in the vicinity of the Bogs.

8th.—Where Locks may be necessary, the dimensions which the Commissioners recommend are,

	Feet.	in.
Length - - - - - - - - - -	70	1
Breadth - - - - - - - - - -	7	3
Depth over the sill of the Gates - -	4	0

9th.—In all cases where the Bogs are wholly or partially surrounded by high land, whose natural inclination is to the Bog, the Engineers are to consider where Catch-water Drains may be necessary; and as it will generally happen that these Catch-water Drains may admit of a greater fall than it will be practicable to give to the main Drains, care must be taken, that where the Catch-water Drains are to join the main Drains after their issue from the Bog, it shall be at such a distance, or on such a level as to preclude the danger of the water of the Catch-water Drains in time of floods penning back the water of the main Drains, so as to overflow the Bog. Where the levels will not admit of the waters of the Catch-water Drains being conducted into the Main Drains, without being subject to this inconvenience, provision must be made for conducting them through separate channels into the river or other place, where the waters of the Bog are to be discharged.

10.—Each of the Engineers is to prepare a Map of the District assigned to him, distinguishing,

1. The extent and boundaries of the Bogs, which it contains.
2. The nature of the soil and country immediately contiguous to each Bog, particularly specifying the situations of limestone, limestone gravel, marle, or other manures.
3. The surface of the Bog, whether firm black bog, or shaking quagmire.
4. The situation of any springs, rivers, or lakes, which appear to occasion the wetness of any of the Bogs.
5. The course of any rivers, streams, roads, or canals, by which the Bog is intersected.
6. The Drains and other Works proposed by the Engineers.
7. Such lines of new roads as appear most proper for the carriage of manure, for carrying out the future produce of the reclaimed Bogs, and for communication with the roads in the vicinity.

11.—These Maps are to be accompanied by Sections, delineating the surface and bottom of the Bog, and the nature and depth (as far as may be necessary) of the under strata on which it rests.

12.—The Maps and longitudinal Sections are to be drawn on a scale of four inches to an Irish mile, and the perpendicular scale of the Sections to be $\frac{1}{20}$ inch to the foot.

13.—They are to be accompanied with Index Maps, on the scale of One Inch to a Mile.

14.—In taking the levels necessary for determining the Sections, the Engineers are to take care that their Assistants proceed, in all cases, so as to cross and correct each other. Two Engineers are to be responsible for the correctness of the whole.

15.—The main Drains are generally to be laid down, so as to allow the collateral Drains communicating with them, to embrace the greatest extent of surface the nature of the Bog will admit of; but where the inequalities of level in its surface, or the outlets of discharge for the waters, present a choice of plans for its drainage, so as to induce any doubt in the mind of the Engineer, which plan may be most eligible, he is to submit the different plans to the Commissioners.

16.—The Engineers are to accompany the Maps with written Reports, containing generally whatever occurs to them on the subject of the drainage of the Districts assigned to them, and particularly specifying,

17.—The probable expense of such Drains, Roads, Canals, Locks, and other Works as they recommend:

18.—The names of the proprietors who claim any right or interest in the Bogs, and to what extent, and in what proportions, as far as they can learn:

19.—Whether any and what tracts of Bog in their Districts have already been reclaimed, and what have been the manures used, and the modes pursued, in their amelioration, and what is the nature and the state of the crops which they actually produce:

20.—The probable value of the land when reclaimed, and the mode of culture which may be the best adapted for it, particularly distinguishing those parts that may be best suited for planting.

21.—Where any of the Bogs proposed to be drained are at present used for the supply of fuel, the Engineer is to report how far the quantity and quality of the fuel is likely to be injured or improved by the works which he recommends.

22.—Where the wetness of the Bog appears to be occasioned by a lake on a higher level, the Engineer is to report on the practicability and means of draining the lake, and also on the difference of levels in summer and winter, of all rivers and lakes connected with the Bogs.

23.—Where the bottom of the Bog is lower than the river into which it would be convenient to discharge the waters of the drains, the Engineer is to report on the practicability of lowering the river sufficiently to receive them.

24.—As in many instances the levels may not admit of the Bogs being drained in the usual manner, in such cases the Engineer is to take into consideration the propriety of draining it by means of wind-mills, pumps, or other machinery; the expense of erection, and annual charge of which, he will include in his Report.

25.—The Engineers are further to consider what situations may best answer for the Corn Mills which may become necessary, in consequence of the increased tillage of the reclaimed districts, and how far the water of the drains may be used in working them; and they are particularly to inquire as to the situation and circumstances of such Mills already in existence, the supply of whose water may be affected by the projected drainages; and to consider and report, whether it may be most expedient to provide reservoirs for their supply, or to purchase the interest of the proprietors.

26.—They are also particularly to report, where any of the proposed works appear likely to diminish the supply of water for the Grand or Royal Canals, or other Navigations, or to interfere with their levels or embankments; and in what manner such injuries may be best obviated.

27.—In order to connect the respective Surveys with each other, and to enable the Commissioners to judge how far these Drains may be applied to the purposes of Internal Navigation, they propose to direct that the Engineers, to whom the Districts nearest to Dublin may be allotted, shall ascertain. with the utmost accuracy, the difference of level between the levels in their Maps, and of the platform on the capital of the Column erected to the memory of Lord Nelson; and to communicate the difference of level to the Engineers, who may have Districts immediately beyond them, for the purpose of carrying forward the comparison. The Commissioners intend afterwards to request the Ballast Office to mark at the Pigeon-House Dock the level of high water in an ordinary spring-tide in the Bay of Dublin, so that by determining the difference of level between that and the platform on the Column, the difference between the level of the sea, and of the various levels which are to be taken in pursuance of these Instructions, may be correctly ascertained.

28.—To enable the Commissioners to complete the connection of the surveys, if such should hereafter be deemed expedient, the Engineers are to leave permanent marks at the extremities of the several levels, and to lay down all remarkable objects which are likely to be permanent, such as raths, castles, towers, cairns, hill-tops, market-houses, &c.

29.—The various lines of levels are to be shown on the Map by dotted lines.

30.—The Engineers are to act under these Instructions, in respect to all such Bogs within their Districts as contain by estimation or repute more than 500 Irish acres; of Bogs of inferior extent they need only report the existence and situation.

31.—The Commissioners intend to provide the best levelling instruments, which they will supply at the original price to such of the Surveyors employed as are not already furnished with Instruments of sufficient accuracy. They intend also to procure some Rain Gauges, to enable them to determine the dimensions of the principal drains. They request that any Gentleman disposed to assist by keeping an account of the rain in the vicinity of the Bogs, will be so good as to signify his intentions to the Secretary.

By order of the Board,
B. M^{c} CARTHY,
Sec^{y} to the Commissioners.

Dublin Society House,
Sept. 28, 1809.

The Commissioners appointed to inquire into the nature and extent of the several Bogs in Ireland, and the practicability of draining and cultivating them, have judged it necessary to make the following alterations and additions to the thirty-one articles of the instructions already issued by them to their Engineers:

32.—The Commissioners have determined to alter the longitudinal scales of the Sections referred to in the twelfth article of the instructions, from eighty perches to an inch (as therein directed) to forty perches to an inch, the scale which on further consideration they have preferred to adopt. The perpendicular scale of the Sections (namely $\frac{1}{20}$ inch to a foot) is to continue unaltered.

33.—As it will probably be found inexpedient to incur the expense of engraving the drawings of the Sections referred in the eleventh article of the instructions, the Engineers are to specify the lines of Sections, and the amount of fall in each, in their reports, and further to specify them upon their Maps, so far as they may find it not convenient to do so.

34.—The Commissioners have determined that it will not be necessary (at least for the present) to execute the Index Maps referred to in the thirteenth article of the Instructions.

35.—The Engineers are to prepare, for the purpose of being presented to Parliament, Maps, on the scale of two inches to an Irish mile, reduced from their large Maps, specifying every thing contained in the large Maps. These reduced Maps are to be sent in along with the reports of the Engineers to the Commissioners. The largest sized copper-plate that can be allowed for these Maps is twenty-six inches long by twenty broad. Where the District is so large that a Map of the whole of it cannot be contained within these dimensions, the Engineer must consider how the District may best be subdivided.

36.—The Engineers are in all cases, both in their Maps and in their reports, to express the contents of the Bogs, both in Irish and English acres, and also to insert in their Maps scales of both Irish and English miles.

37.—The Commissioners not judging it expedient for the present to lay down a Meridian for the purpose referred to in the twenty-eighth article of their Instructions, consider it sufficient that the Engineers should construct their Maps upon the Magnetic Meridian, the north of the Magnetic Meridian, pointing to the top of the Map, and the Meridian line being parallel to the sides of it.

38.—The Estimates referred to in the seventeenth article of the Instructions, are to include all the expenses which in the judgment of the Engineer will be necessary to reduce the Bog to such a state, that it shall be ready to receive agricultural improvements. These estimates are however to distinguish the expenses of the different descriptions of works, and of the different classes of Drains recommended.

By Order of the Board,
B. M^{c} CARTHY,
Sec^{y} to the Commissioners.

Dublin Society House,
May 16, 1810.

Appendix, No. 2.

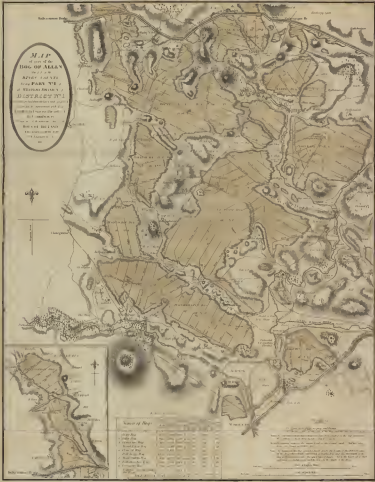
An ACCOUNT of all Engineers, Surveyors, Clerks, and Officers, appointed and employed by the Commissioners appointed to inquire and examine into the Nature and Extent of the several BOGS in IRELAND, and the practicability of Draining and Cultivating them; together with the Dates of their Appointments, and the Amount of the Salaries, Wages, Allowances, and Rewards, directed and appointed by the said Commissioners to be paid to each and every of them, between the 16th of April 1810 and the 5th of January 1811.

NAMES.	Situation.	Date of Appointment	Rate of Salary.	Rate of other Allowances	Rewards.	Total time actually employed.	Total Amount of Salaries and Allowances paid.
			£.				£. s. d.
Bucknall McCarthy - -	Secretary	19 Sep. 1809	200 per Ann.	none	none	3 quarters of a year.	150 — —
Peter Theodore Wilson -	Clerk	23 - —	50 guineas per Ann.	none	ditto	ditto	42 13 1½
Richd Griffith, jun. F.R.S. Edinburgh, Hon. Member of the Geological Society, London - -	Engineer	28 - —	2 guineas a day when employed	1 guinea a day travelling expenses when actually out on survey	ditto	246 days	761 4 6
Richd Lovell Edgeworth -	ditto	28 - —	ditto	ditto	ditto	108 d°	335 11 3
Thomas Townshend -	ditto	9 Oct. 1809	ditto	ditto	ditto	104 d°	338 19 6
Richard Brassington - -	ditto	24 - —	ditto	ditto	ditto	74 d°	252 10 6
James Alexander Jones -	ditto	15 Nov. —	ditto	ditto	ditto	48 d°	128 10 9
John Longfield - -	ditto	6 Dec. —	ditto	ditto	ditto	133 d°	441 7 —
David Aher - - -	ditto	3 Jan. 1810	ditto	ditto	ditto	99 d°	337 16 9
William Bald - - -	ditto	22 May —	ditto	ditto	ditto	166 d°	429 19 6
Thomas Colbourne - -	ditto	4 Sep. —	ditto	ditto	ditto	31 d°	105 15 9
John Molloy - - -	Surveyor	7 Oct. 1809	1 guinea per day when employed	none	ditto	231 d°	262 15 3
Hill Clements - - -	ditto	14 - - —	ditto	ditto	ditto	65 d°	73 18 9
Richard Buck - - -	ditto	10 Feb. 1810	Half a guinea a day	ditto	ditto	197 d°	112 — 10½
R. Warwick - - -	ditto	3 - - —	1 guinea per day	ditto	ditto	77 d°	87 11 9
Chr Quin - - -	ditto	16 Dec. 1809	ditto	ditto	ditto	230 d°	261 12 6
Thomas Dowd - -	ditto	2 - - —	ditto	ditto	ditto	42 d°	47 15 6
Francis Meara - -	ditto	13 Jan. 1810	ditto	ditto	ditto	136 d°	154 14 —
Henry Armstrong - - -	ditto	20 Feb. —	ditto	ditto	ditto	207 d°	235 9 3
John McGowan - -	ditto	27 Jan. —	ditto	ditto	ditto	94 d°	106 18 6
Frederick Reilly - -	ditto	17 July —	ditto	ditto	ditto	141 d°	160 7 9
James Brown - - -	ditto	14 Oct. 1809	ditto	ditto	ditto	64 d°	72 16 —
Patrick Leahy - - -	ditto	27 Jan. —	ditto	ditto	ditto	67 d°	76 4 3
John Thomas - - -	ditto	12 Nov. —	ditto	ditto	ditto	72 d°	81 18 —
William Edgeworth - -	ditto	21 Oct. —	ditto	ditto	ditto	163 d°	185 1 3
James Johnston - -	ditto	28 - - —	ditto	ditto	ditto	90 d°	102 7 6
James Grier - - -	ditto	2 Dec. —	ditto	ditto	ditto	14 d°	15 18 6
John Hampton - -	ditto	9 - - —	ditto	ditto	ditto	177 d°	201 6 9
Hill Clements - - -	ditto	25 June —	ditto	ditto	ditto	127 d°	144 9 3
Henry Clements - -	ditto	20 Oct. —	Half a guinea a day	ditto	ditto	65 d°	36 19 4½
Simon Knight - - -	ditto	2 June —	1 guinea a day	ditto	ditto	128 d°	145 12 —
Michael Hogan - -	ditto	2 Aug. —	ditto	ditto	ditto	23 d°	26 3 3
Francis McGrevy - -	ditto	31 July —	ditto	ditto	ditto	54 d°	61 8 6
John Jennings - - -	ditto	22 Sep. —	ditto	ditto	ditto	16 d°	18 4 —
William Johnston - -	ditto	29 - - —	ditto	ditto	ditto	36 d°	40 19 —
William Baffett - -	ditto	12 Oct. —	7s 6d a day	ditto	ditto	48 d°	18 — —
Patrick Knight - -	ditto	25 Nov. —	1 guinea per day	ditto	ditto	8 d°	9 2 —
Richard Richards - -	ditto	27 Aug. —	ditto	ditto	ditto	66 d°	75 1 6
Geo. Ringwood - -	ditto	1 Sep. —	ditto	ditto	ditto	42 d°	47 15 6
						TOTAL - - - £.	6,186 19 4½

Appendix, No, 3.

AN ACCOUNT of all Sums paid by or under the Authority of the Commissioners appointed to inquire and examine into the Nature and Extent of the Bogs in IRELAND, and the practicability of draining and cultivating them: exclusive of Salaries, Wages, Allowances and Rewards; between the 16th of April 1810 and the 5th of January 1811; together with an Account of the Services and Purposes for which the same were paid.

	£. s. d.
To paid Staffmen, Chairmen and Labourers attending on the Engineers and Surveyors, from 16th April 1810 to 5th January 1811 - - - - - - - -	1,341 19 3
- paid Graisberry and Campbell for Printing - - - - - - - -	43 4 3
- paid Messrs. Arch, London, for Books on Drainage - - - - - - -	15 1 11
- paid carriage of - - - D° - - - - - - - -	— 11 8
- paid for oiled Silk to cover Reports to Parliament - - - - - - -	— 10 10
- paid Fitzpatrick for Scrivenery - - - - - - - - -	15 8 11½
- paid Postage - - - - - - - - - - - - -	30 11 5
- paid for Stakes, Boring-Irons, repairs of Boring-Irons, &c. &c. used by Engineers -	31 16 6
- paid small contingents, such as Fees at Treasury, carriage of Parcels, &c. - - -	2 4 —
£.	1,481 8 9½


MAP
of part of the
BOG OF ALLEN
in the
KINGS COUNTY
being PART No. 1 of
the WESTERN DIVISION of
DISTRICT No. 1
BOGS OF IRELAND
Names of Bogs
Total
Ballycommon Bridge
Rathcoffey
Clonegowan

Appendix, No. 4.

REPORT on the practicability of Draining and Improving a part of the BOG of ALLEN, situated in the King's and Queen's Counties; being the Western Division of District No. 1.—By *Richard Griffith*, jun. Civil Engineer, F. R. S. Edinb. and Honorary Member of the Geological Society of London, &c. 1811.

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To the Commissioners appointed to inquire and examine into the nature and extent of the several Bogs in Ireland, and the practicability of draining and cultivating them, and the beſt means of effecting the same.

Gentlemen,

IN the month of June last I had the honour of submitting to your consideration a Report on the practicability and expense of draining that part of the Bog of Allen, in the County of Kildare, which is situated to the east of the Feagile River; in the commencement of which Report, I observed that, "Having taken a general view of the whole of the Bogs contained in District No. 1, I found it expedient to divide it into two distinct parts, viz. 1st part east, and 2d part west, of the Feagile River; as it was evident, from the relative positions of the Bogs, that the first or eastern division, might be perfectly drained, without any interference with the second or western division. The only material circumstance relating to the second division, (which was considered in my former Report and Estimate) being, the probable quantity of water which might be produced by the drainage thereof, for which I have made an adequate allowance in the proposed improvements on the Feagile River; which river will form the principal main Drain of both Divisions.

Report on that part of the Bog of Allen situated to the caſt of the Feagile River, made in June 1810.

Reasons for dividing the District.

General DESCRIPTION of the DISTRICT.

I am now about to report on the practicability and expense of draining that part of the Bog of Allen, situated in the King's and Queen's Counties, which extends westward of the Feagile River, and which forms the western division of District No. 1.

The present Report is on the District of Bog, which extends westward of the Feagile River.

These Bogs, although much more detached than those which compose the eastern division of this District, are similarly circumstanced with respect to the adjoining country, being uſually enveloped by irregular ridges of limestone rock or limestone gravel of various elevations, having low and narrow passes between them, through which the waters from the neighbouring Bogs may be discharged into the nearest river or stream.

These Bogs are similarly circumstanced with those of the Eastern Division, being surrounded by hills of Limestone Gravel.

This division of the District is bounded on the north by a ridge of steep hills, superficially composed of limestone gravel; limestone rock, however, sometimes makes its appearance at the surface, as at Tubberdaly, Croghan, &c.

Boundaries.

Northern Boundaries.

In continuation of the northern boundary of the eastern division of this District the ridge of hills extends westward, from Edenderry by Tubberdaly to Coole, and from thence to Croghan Hill*, from the western tail of which the gravel ridge continues its western direction to Cloncarl, where it takes its northern course, and verges along the east side of Ballycommon Bog as far as Mountrath; at Mountrath the ridge again changes its direction, and runs westward to Bracklin.

Western Boundary.

The western boundary of this District, commencing at Bracklin, extends in a southern direction along the western edge of Ballycommon Bog, by Rathdrum to Ballycommon house, a little to the southward of which the Grand Canal crosses the Bog, which is itself the summit in that part of the country, as the water from the eastern side of it falls to the river Barrow, and from the western side to the river Shannon. On the southern side of the narrow valley in which the Canal has been formed rises the high land of Knock, which continues in a southern direction by Ballynagar to Geashic; at Geashic the ridge changes its direction and runs westward by Curragh to Ballyeollin, where it again turns to the southward, and continues by Ballyevil and Killcavan to the river Barrow, beyond the two-mile bridge near Mountmelick; at the opposite side of the river Barrow rises the Capard ridge of the Slieve Bloom Mountains, which takes a south-eastern direction, and forms the south-western boundary of the District.

Southern Boundary.

Eastern Boundary.

This division of the District is bounded on the south by the high land on the southern side of the Tryhogue stream and the River Barrow, between the towns of Maryboro', Portarlington, and Monastereven, and on the east by the lower part of the Little Barrow and the Feagile River, between Monastereven, Clonbullock, and Shean, which separates it from the eastern division of this District, already described in my former Report.

The District should have been called District of the River Barrow.

The District of Bog that has been denominated, District No. 1, might, perhaps, have been more correctly called The District of the River Barrow, as it is evident from the description of the boundaries of both divisions of the District (given in my former and present Report) that the whole of the waters running in the interior of those boundaries must fall into one or other of the rivulets or streams which ultimately discharge themselves into the River Barrow.

THE RIVER BARROW.

River Barrow.

Has its source in the Slieve Bloom Mountains.

The River Barrow takes its rise in Glenbarrow, in the Slieve Bloom Mountains; the general directions of its course is from north-west to south-east, at least as far as Monastereven, where my District ends.

It runs in the lowest valley in the country.

It will not be necessary to improve this River for the purpose of draining the Bogs.

A full description of this River will be found in the Appendix.

Although this River runs in the lowest valley, and forms the principal feature in the country, yet the Bog of Garryhinch is the only one of consequence which immediately discharges its waters into it; on this account it will not be necessary to make any improvements in the River for the purpose of draining the Bogs, at least in that part which is above the junction of the little Barrow River near Monastereven; I shall not therefore enter into a minute description of the River Barrow in the body of this Report; but knowing that the low lands on both sides of that River might be considerably increased in value, by lowering the several sharps which at present impede the current of the water, I think it incumbent on me to give every information in my power which may tend to the general improvement of the country by drainage; and I am enabled to do so correctly in the present instance, as I found it necessary, for the general purposes of the inquiry in which I was engaged, to level and survey the River Barrow; I have therefore given (in the Appendix to this Report) a full description of that River, which is accompanied by a Section. I have not however deemed it necessary to estimate the expense of the proposed improvements on the River, as they are not, as already stated, necessary to the drainage of the Bogs.

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* Croghan-hill is nearly similar in its composition to the hill of Allen, described in my Report on the Eastern Division of this District; it is however much higher; it forms the boldest feature in the country looking northward, its southern face presents numerous mural precipices rising above each other, the acclivity of the land between them is very precipitous; the height of this hill above its immediate base is 500 feet. The lowest rock visible is composed of flinty Limestone, interstratified with thin beds of black slate Clay, the dip is 33° east of south, at an angle of 5° from the horizon. The next rock visible in situ above the Limestone is decomposed Porphyretic Greenstone; at 100 feet above the base, the mass of Porphyretic Greenstone is compact, in this case the crystals of Feld-spar are very distinct, large, and beautiful; again ascending about 200 feet the rock assumes the appearance of fine-grained Greenstone (crystals of Feld-spar being rarely met with). The Greenstone approaches nearly to the summit of the hill, at the apex of which the rock was found to contain much calcareous Spar; also some minute crystals of Feld-spar were observable. Descending on the northern side of the hill, a rock, similar to that at the summit, continues for 200 feet, which is succeeded by fine-grained Greenstone, similar to that already described. At 250 feet from the summit (still descending) stratified Limestone, dipping 30° east of south, at an angle of 8° from the horizon, makes its appearance close to the Greenstone; I did not however discover their junction.

From the point of appearance of the Limestone, a minor hill, composed of this rock, rises abruptly 80 feet; its summit is covered with Limestone Gravel. Descending from the summit of the second hill for 100 feet, the Limestone strata (in some crags which its forms) appears much disturbed, and frequently contorted, and the rocky mass is shivered and broken into angular fragments; here the colour of the rock is light bluish white, the fracture splintery, the mass is hard, but easily frangible; the fragments are indeterminately angular. Descending 90 feet from the point of appearance of this broken rock, Porphyretic Greenstone makes it appearance, and continues to the base of the hill, where it is covered with bog.

It is singular, that those parts where the soil is formed of decomposed Greenstone are unusually fertile, having yielded, time immemorial, excellent crops of Oats and Potatoes without any manure, whilst those parts where the mass of the hill is Limestone, are extremely barren, yielding but very scanty pasture to a few sheep; so that the line of junction of the rocks may with ease be traced by the verdure on the surface.

This division of the District is divided in the interior by two low and narrow vallies, which extend in a direction nearly parallel to that of the River Barrow, namely, from north-west to south-east; in each of these vallies flows a stream of considerable magnitude, which from the lowness of their situation, and their proximity to the Bogs, present a palpable and easy discharge for the waters from the Bogs.

This division of the District is divided in the interior by two low and narrow vallies.

The general direction is from north-west to south-east. These vallies present an easy discharge for the Waters from the Bogs.

PHILIPSTOWN RIVER.

The most northern of these vallies extends from Philipstown by Mount Lucas and Eskermore, to its junction with the vale of the Feagile River, between Shean and Clonbullock.

Philipstown River.

The stream which runs in the bottom of this valley has no sufficiently general denomination, it is in fact the western branch of the Feagile River; I shall call it the Philipstown River.

The water which flows in the Philipstown River may be traced to four principal heads, each of which takes its rise in one or other of the adjoining Bogs. The most northern of these sources rises on the eastern side of Ballycommon Bog. The Grand Canal Company have availed themselves of the elevated situation of this stream, and have made use of it as a supply for their Canal; immediately opposite the entrance of this supply is a regulating over-fall, from which flows the surplus water of the Canal which joins the Philipstown River close to the town of Philipstown.

Has four principal sources.

Northern source.

The other three sources take their rise, one on the western edge of Ballycommon Bog to the south of the Canal, and the other two, on the south-western edge of Mount Lucas Bog, from whence they flow entirely across the Bog, and unite in the valley beyond the northern edge of that Bog, below the hill of Clonadd, from whence being joined by the waters from Ballycommon Bog, the stream takes a northern course, and meeting the stream flowing from the Canal already mentioned, forms the western branch of the Feagile or Philipstown River.

Other sources.

The course of the Philipstown River is in general extremely circuitous; the numerous sharp angles which occur near to each other impede the current so much, that they occasion frequent floods, though there is a sufficient fall for the discharge of the water.

In the event of a general drainage of the neighbouring Bogs, these floods would have a tendency to rise much more quickly than they do at present, as the water would not then flow slowly from the surface of the Bogs, but would be very rapidly discharged by the several Drains into the River; it will therefore be necessary, previously to any attempt towards improving the surface of the Bogs by Drainage, to render the Rivers or Streams capable of effecting the quick discharge of the waters from the Bogs, without flooding the country; if this were not attended to, the injury which the vallies would sustain by the almost instantaneous rise of the floods, might in some instance, equal the benefit which might otherwise be derived from the drainage of the Bogs.

It is necessary that this River should be improved, to render it equal to the quick discharge of the Waters from the Bogs; otherwise the winter floods will be greater than they are at present.

The fall from the junction of the streams at Philipstown to the junction of Eskermore Mill Stream with the Philipstown River is 22F. 6IN., and the distance 5M. 2F. 20P.

The upper part of the River, viz. from Philipstown to Eskermore is extremely crooked; it will not, however, be necessary to make any material alterations in it for the purpose of giving vent to the waters from the Bogs, as all the principal Bog Drains, (see Map) will discharge their waters into the Philipstown River below Eskermore.

At Eskermore the Philipstown River is joined by the Esker Stream, the north-western branch of which divides the Bog of Down into two distinct parts; having passed the Bog, it runs in a narrow valley between the Lands of Ballymurrin and Newtown, and afterwards skirts along the south-western edge of Esker Bog; before it reaches Esker Mill it is joined by the north-western branch of the stream, which passes through Esker Bog, and divides it also into two parts.

After the junction of Esker Stream, the vale of the Philipstown River is for the first time bounded on both sides by Bog, which extends on the north side to Cloncrane, and on the south to Clonevoe; below this point the River winds rather less than in the upper part, it is however extremely sluggish, the whole fall between Esker and the junction with the Feagile River above Clonbullock is 4F. 6IN. and the distance is 3M. 7F. 20P. which is equal to 1F. 2IN. fall per Irish mile.

Below the junction of Esker Stream the River is bounded on both sides by Bog

It is very sluggish.

At 0M. 6F. 20P. below the junction with the Esker Stream, the Philipstown River is joined by a stream running from the Welch Islands which separate the Bog of Mount Lucas from that of Cloncast. This stream may be formed into a main Drain for the discharge of the waters from the adjoining Bogs.

River joined by the Stream from the Welsh Islands.

At Colliga, a little below the junction of the stream from the Welsh Islands, the valley expands on the south side; on the north side, the River runs close by the edge of Cloncrane Bog; opposite the hill of Cloncrain the valley expands to the northward, and forms ex-

96. tensive

Philipstown River

tensive grassy grounds, which continue increasing in width as far as the junction with the vale of the Feagile River. This valley is flooded nine months in every year.

The fall of the Philipstown River, from Esker, to its junction with the Feagile River, being so extremely small, it is indispensably necessary that the greatest care should be taken to remove every interruption to the current of the water, particularly from that part near the hill of Clonerane, where the valley expands, that is, for the last mile, in which space the water falls but 10 inches. Half a mile above the junction of this River with the Feagile a new course has been formed in a straight line, called Denaels Drain, the beneficial effects of which are totally done away by a Weir having been thrown across the new Drain just at the point of its commencement. The intention of this Weir is to divert the water from the River into a Mill-race, which has been formed from that point, nearly on a dead level to Clonbullock Mill; this Weir must unavoidably be removed, and wooden Sluices substituted in its place, which in times of flood may be raised so as to give a free passage for the discharge of the water.

New course of River, Dennels Drain.

It is to be feared that these precautions will not of themselves completely accomplish the desirable end of freeing the lands from winter floods; it will be necessary, in addition, to form embankments similar to those recommended in my former Report, to keep the River Blackwater within bounds.

Additional fall of 5 feet given to the River.

In examining the Section of the Feagile River, which accompanied the Report on the eastern Division of this District, it will be observed, that it is proposed to lower that River five feet at and above Clonbullock Bridge, which will consequently give an additional fall of five feet to the lower part of the Philipstown River, over and above what it has at present.

Reference to Map and Sections.

The several points where the River is proposed to be sunk, and where entire new courses are proposed to be formed, are pointed out in the Section of the Philipstown River, and their several dimensions are shown by the cross Sections which I have drawn in the bottom of the same Section. The situations of the several proposed new courses are pointed out in the large Map; owing to the minuteness of the scale, I found it impossible to insert them in the small one.

THE CUSHINA RIVER.

Cushina River.

The second or southern valley, which divides the interior of this District, extends from Moanvaghan, by upper and lower Cushina, to Chevy-chase, where it meets the wide and extensive valley of the Little Barrow River.

Sources.

The Cushina River, which runs in this valley, has two principal sources, the most northern takes its rise in the interior, not very far from the northern edge of Ballykeane Bog; the water from this source runs a little to the west of south, and divides the Bog into two nearly equal parts; having passed the Bog, the stream has been diverted from its natural course, and is conducted on a higher level for the purpose of supplying water to the Mill of Ennaghan. Below the Mill the Stream runs in a boggy valley between the hill of Ennaghan and the eastern edge of Moanvaghan Bog; beyond the road from Portarlington to Mount Lucas it joins the southern course of the Cushina River, which takes its rise near Ballyevil on the south-western edge of Geashil Bog; this stream verges along the southern edge of that Bog, and afterwards running by Bloomfield continues its course to Bogtown Mill, from whence it passes along the western edge of Moanvaghan Bog, and afterwards separates that Bog from the Bog of Portarlington.

The union of these northern and southern sources forms the Cushina River, which takes a serpentine course amongst numerous hills of limestone gravel; these hills are almost universally placed between the River and the Bogs, situated both to the north and south, and prevent the passage of the waters from them, excepting in those situations where small vallies occur between the hills.

The fall of this River, from the meeting of its sources to its junction with the Little Barrow River at Chevy-chase, is 19F. 6IN. the distance is 4M. 0F. 10P., which considered generally is a very sufficient fall; but unfortunately it is by no means equally distributed the fall in the last mile being but three feet.

The proposed excavations in this river are pointed out in the Section of the Cushina River, and the several alterations in its course are shown on the large Map by double red lines.

Feagile River.

The Feagile River which separates the eastern and western divisions of District No. 1. has been described in my former Report, from its commencement at Shean to its junction with the Little Barrow River, below Brackna Mill.

The LITTLE BARROW RIVER.

Little Barrow River.

The general appearance of the Little Barrow River, from the junction of the Feagile River to its final discharge into the River Barrow, above the Pass Bridge near Monastereven, is materially different from any of the Rivers I have had occasion to describe, its curves being much bolder and more extensive; this River has much less fall than any other I have met with, the difference of height between the junction of the Feagile River, and its junction with the River Barrow, being but 3 F. 6 IN., whilst the distance between those points, by the present course of the river is 3M. 4F. 4P., which is but 1 foot fall per mile.

Little Barrow River.

Nearly the whole of the Waters from both divisions of this District must pass through this River.

Nearly the whole of the waters from the Bogs, which compose the eastern and western Divisions of this District, must necessarily pass through this lower part of the Little Barrow River previously to its discharge into the River Barrow; no pains or expence should therefore be spared to free its course from bends or other obstructions to its current, otherwise the widely extended grassy valley, containing 670 Irish acres, situated chiefly to the west side of the River, will unavoidably be rendered more liable to the depredations of the Winter floods than it is at present, for the reasons already assigned in the description of the Philipstown River.

On examining the Map of the Little Barrow River, which I send on an enlarged scale of 40 perches to an inch, it will be observed that two considerable deviations from the present course are proposed; these deviations are marked on the Map by double red lines, and would, if executed, shorten the River 0M. 4F. 20P.

Reference to Map and Sections.

The quantity of excavation in the proposed new courses of the river, and also the sinking in the bottom of the present course, are pointed out by the red line in the Section of the Little Barrow River. As the addition of even a trifling fall would be of considerable advantage to the Little Barrow River, I have added to my Section of that River an extent of 3F. 20P. of the River Barrow, below the junction of those Rivers, that is, to the tail of the fall below the Pass Bridge near Monasterevan; in this short distance there is a fall of 1 foot 2 inches, which, if taken up so as to make nearly an uniform fall between the junction of the Feagile River with the Little Barrow and the Pass Bridge, would greatly facilitate the discharge of the winter floods from the upper part of the River.

Embankments will be necessary to keep the Rivers within bounds in Winter.

For the protection of the great flat situated to the west of the Little Barrow River it is extremely necessary that embankments should be formed, 30 feet distant from the banks of the River on either side, at least 4 feet high; these embankments, together with the proposed improvements in the bed of the River, would, I have no doubt, protect those vast tracts of meadow ground from the winter floods;—the quantity of earth necessary to form the embankments may by proper management be supplied from the excavation of the drains to be made for the discharge of the water into the River Barrow (at the junction of the Rivers) which may fall in the interior of the valley in wet seasons.

A quarter of a mile below the junction of the Feagile River the Little Barrow is joined by the Cushina River.

Sir John Macartney Improvements on Low Lands and Bog.

Sir John Macartney (who has done more than any other person I know of in this part of the country towards the general improvement of Bogs and Low Lands) some years since formed an embankment close along the edge of the Cushina River, for a considerable distance above its junction with the Little Barrow, and also along the western bank of the Little Barrow, from the point of junction of the Cushina River to that part of the River which approaches nearest to the hill of Derry Lea;—these embankments have had a very considerable effect in preventing the winter floods from overspreading that part of the valley which they enclose, and have consequently rendered that ground highly valuable.

DIVISION and NUMBER of BOGS.

Into one or other of the Rivers above described, the Waters from each of the Bogs may be discharged.

In the foregoing pages I have given a general description of the several Rivers and Streams which traverse the western Division of District No. 1, into one or other of which the waters from the several Bogs which compose the District may be discharged.

The Bogs are divided into thirteen Divisions.

To prevent confusion, it will be necessary to divide these Bogs into thirteen divisions, each of which is separated from the other, either by ridges of limestone gravel or by a low valley, in the bottom of which in every instance, is a small rivulet or stream, into which the waters from the surface of the Bogs, which rise considerably above the stream, may with great facility be discharged.

In the description of these several Bogs, I shall, for the sake of clearness, commence with the Bog which is situated most to the north, and proceed regularly downwards to those which are situated most to the south; according to which rule the several Bogs will arrange themselves in the following order;

Names and number of the Bogs.

Ballycommon Bog, or - - No. 1;
Down Bog, or - - - - No. 2;
Esker Bog, or - - - - No. 3;
Cloncrane Bog, or - - - No. 4;
Mount Lucas Bog, or - - No. 5;
Clonsart Bog, or - - - - No. 6;
Bally Reane Bog, or No. 7;
Moanvaghan Bog, or - - - No. 8;
Portarlington Bog, or - - - No. 9;
Ummerus Bog, or - - - - No. 10;
Geashil Bog, or - - - - - No. 11;
Garryhinch Bog, or - - - - No. 12;
Derry Gyle Bog, or - - - - No. 13.

Map on large Scale.

The large Map which accompanies this Report, contains, in one sheet, the several Bogs which compose the western division of District No. 1.

Maps on small Scale

In compliance with the prescribed dimensions for the Map on the reduced scale, I have found it necessary to divide the second or western Division of this District, into two separate Maps; I have also been obliged to place the Bog which is situated most to the north, viz. Ballycommon Bog, in a compartment by itself, in the south-western corner of Map No. 1.

Particular DESCRIPTION of the several BOGS.

BALLYCOMMON BOG, or No. 1.

Ballycommon Bog, or No. 1.

This Bog, which is the most northern in the District, contains,

	Irish Acres.	Total Irish	Eng. Acres.
Of fibrous or red Bog - - - - - - -	1,691		
Of compact or black Bog, where Turf has been cut -	59	1,750	or 2,834.

It is bounded on the north, east, and west, by steep ridges of limeſtone gravel, extending from Philipstown, in a northern direction, by Ballymullen and Lackin to Mountrath, and from thence, in a southern direction by Bracklin and Rathdown to Ballycommon; between Ballymullen and Ballycommon this Bog is crossed by Philipstown level of the Grand Canal; to the south of the Canal, the high land of Knock forms the western boundaries.

Boundaries.

This Bog is bounded on the south by the high land of Clonadd, between which and the steep edge of the fibrous or red Bog, there is a tolerably extensive valley of black or compact Bog, through which one of the sources of the Philipstown river (already mentioned) takes its course.

Besides the Canal, this Bog is divided in the interior by two streams; the most northern takes a north-western course across the Bog:—having passed which it skirts along the western edge, and supplies the Mill of Bracklin with water; this water ultimately falls into the river Shannon.

The most southern rises on the western edge of the Bog at Rathdrum, and takes a south, eastern course; having passed the Bog it runs south, and falls into the Canal; its original course was however to the Philipstown river, which ultimately discharges itself into the River Barrow.

These streams, which rise within a very small distance of each other, run, as it appears from the foregoing description, in exactly opposite directions, and their waters are discharged into the Sea, one on the west, and the other on the east coast of the Island, which proves that the Bog between them is in that part the summit of the Country.

The northern and eastern edges of this Bog, between Bracklin, Mountrath, and Lackin, are much higher than the western, between which and the gravel ridge which bounds the Bog, runs the stream already mentioned, which supplies the Mill of Bracklin with water; this stream is sufficiently low for the discharge of the waters from the Bog, north of Bracklin Mill-stream, and also for the Bog north of the summit in the Bog A B.*

The fall between the surface of the Bog at Mountrath, in the line of the minor Drain *a b*, is 26F. 6 inches, and the distance is OM. 7F. 20P. and the fall from the summit in the Bog A B, to Bracklin Mill-stream, is 23 feet, and the distance OM. 4F. 6P. this latter may be seen in the longitudinal Section of Ballycommon Bog, or No. 1.

The waters from the Bog, south of the summit A B, and north of the Canal, may be discharged into the grand Canal supply stream by minor Drains, as shown on the Map.

This stream will require much sinking to render it sufficiently low for the discharge of the waters from the Bog, which will not, however, at all interfere with it, as a supply for the Canal, as there is a fall of 15 feet between the letters *c* and *d*, and there is also a further fall of 15 feet between the letter *d*, and the surface water of the Grand Canal: the Section of this stream is marked, "*c d*, Bog No. 1."

The fall from the Bog, south of the summit A B, to the proposed bottom of the Canal supply, is 22 feet, and the distance is OM. 6F. OP. and the fall from the surface of the Bog, in the direction of the minor Drain *e f*, to the Canal supply, is 34 feet, and the diſtance is 1M. 1F. 14P. the fall from the Bog north of the summit C D, to the surface water of the Grand Canal, is 26 feet, and the distance is OM. 2F. 24P. (See longitudinal Section of Ballycommon Bog, or No. 1.) The waters from the Bog south of the summit C D, may be discharged into the Philipstown river by the minor Drains drawn on the Map; the fall from the summit to the Philipstown river is also represented in the longitudinal Section of Ballycommon Bog; it is 35 feet 6 inches, and the distance is 1M. 1F. 10P.

Average depth of Bog, 20 feet.

The average depth of Ballycommon Bog, or No. 1. is 20 feet. In comparison with other Bogs it may be considered as very wet, particularly the northern part of it.

Notwithstanding the great facility of draining this Bog, no attempts have as yet been made towards improving any part of it.

The principal proprietors are, the Earl of Charleville, Lord Digby, and Lord Ponsonby.

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* The summit in the Bog A B is 22 feet above the summit level of the Grand Canal, and the summit level of the Grand Canal, being 264 feet above high-water mark in Dublin Bay, the summit A B is consequently 286 feet above high-water mark in Dublin Bay.

DOWN BOG, or No. 2.

Down Bog, or No. 2.

This Bog contains,

	Irish Acres.	Irish.		English Acres.
Of fibrous or red Bog - - - - - - - - - - -	945	955,	or	1,547.
Of compact or black Bog, where Turf has been cut -	10			

Boundaries

It is bounded on the north by the Philipstown level of the Grand Canal, on the south and east by the gravel ridge, extending between Killeen and Ballymurrin; at Ballymurrin there is a low valley through which the Esker stream runs; the high land of Newtown rises on the opposite side, and continues to Clonmeen.

This Bog is bounded on the west by the high ridge of Mount Briscoe and Killion.

Down Bog is divided in the interior into two unequal parts by a low valley, in which runs a small stream, which rises at Coole on the northern side of the Grand Canal, and passing through a Tunnel under the Canal takes a winding course through the Bog.

This stream may be converted into a main Drain for the discharge of the waters from the Bog on either side; it will however require much sinking and widening, as its course is at present extremely irregular; at *e*, which is nearly the centre of the Bog, the water of the stream has been taken up and carried in a new course, for the purpose of supplying the Mill of Newtown with water; the level of the water in this new course is nearly the same as that of the old.

The Mill-stream will also require some improvement, which will not however necessarily interfere with the Mill-site, as the surface of the Bog (as appears by the longitudinal Section,) near the edge is 14 feet above the surface of the water in the stream.

The water of this Bog, north of the summit E F, may be discharged into the stream from Coole, by the minor Drains which are drawn on the Map.

The fall from *f*, on the edge of the Bog below Mount Briscoe, to *g* on the Newtown Mill-stream is 25 feet, and the distance in the direction of the minor Drain is 1M. 0F. 20P. and the fall from the surface of the Bog at *h*, south of the Grand Canal, to *i* on Coole stream, is 18 feet and the distance in the direction of the minor Drain is 7 furlongs.

The fall of the water from the Bog south of the summit E F, is to the Philipstown River; it may be discharged by the minor drain *k l* into a small stream which runs south from the edge of the Bog, and falls into the Philipstown River, nearly opposite Mount Lucas; the fall from the summit in the Bog E F to the Philipstown River is 38 feet, and the distance is 0M. 5F. 20P.

The average depth of the Bog is 22 feet, it contains no Quagmires—In comparison with other Bogs, it may be said to be firm; some trivial attempts towards its improvement have been made on the western edge near Mount Briscoe, but the principal drain was originally made much too broad at bottom, it will therefore require frequent scourings.

The principal Proprietors of this Bog are, the Earl of Charleville, Lady Anne Gore, and Mr. Briscoe.

ESKER BOG, or No. 3.

Esker Bog.

This Bog contains,

	Irish Acres.	Irish.		English Acres.
Of fibrous or red Bog - - - - -	955	985,	or	1595.
Of compact or black Bog, where Turf has been cut	30			

It is bounded on the north by the gravel ridge of Leitrim, on the south by the gravel ridge of Eskermore, on the east by the high land of Rathlumber, Longstone and Lumville, and on the west by the gravel ridge of Newtown and Clonmeen, which separates it from Down Bog.

This Bog is divided in the interior by the stream called Cushhonnagowragh, which runs in a very low valley; some pains have been taken by Mr. Cartland to improve the course of this stream, which will make an admirable main Drain for the whole of the waters of this Bog, excepting the southern part, the waters from which I propose to discharge into the Esker stream, as appears by the minor Drains drawn on the Map.

The fall from the surface of the Bog at *l* to Cushhonnagowragh stream at M, is 20 feet, and the distance in the direction of the minor Drain *l m*, is 0M. 7F. 8P. and the fall from the surface of the Bog at *n* to Cushhonnagowragh stream at O is 25 feet, and the distance, in the direction of the minor Drain *n o*, is 0M. 5F. 32P.

The average depth of this Bog is 26 feet, it contains no Quagmires; generally speaking it is tolerably firm.—The surface of the Bog, both on the east and west side of Cushhonnagowragh stream, has been lately much intersected with Drains by Mr. Cartland, they appear to me to be made much too close to each other; as the Bog subsides, I think it probable the surface will become too dry.—Owing to the minuteness of the Scale on which my Map is drawn, I found it impossible, consistent with clearness, to insert any of Mr. Cartlands improvements.

The principal Proprietors of this Bog, are the Marquis of Downshire, Lady Anne Gore, and Mr. Cartland.

Cloncrane Bog.

CLONCRANE BOG, or No. 4.

This Bog contains,

	Irish. Acres.	Irish.		English. Acres.
Of fibrous or red Bog - - - - - -	2160	2175,	or	3523
Of compact or black Bog where Turf has been cut	15			

It is bounded on the north by a steep ridge of limestone gravel which extends eastward from Eskermore by Rathvilla and Rathlumber to Ballynakill, which separates it from Esker Bog on the west and south by the Philipstown River, which separates it from the Bogs of Mount Lucas and Clonsast, and on the east by the Feagile River, which forms the boundary between the eastern and western divisions of this District.

This Bog is not divided in the interior by any Valley or Stream worthy of consideration; I have however taken advantage of the lowest situations in laying out the necessary main Drains for the discharge of the water from the Bog.

That part of the Bog situated to the east of the summit G H falls gradually towards the Feagile River. There is no occasion for a main Drain in this part, as the minor Drains (represented on the Map by single red lines) are pointed so as to discharge their waters directly into the Feagile River.

The fall from the summit of the Bog at G to P on the Feagile River, is 28 feet, and the distance (in the direction of the minor Drains G P) is 1m. 0f. 8p. The waters from that part of the Bog which is situated between the summits G H and I K, may be discharged into the Philipstown River by the main Drain *r s*; the fall from *r*, at Derryclaghan, to *s* at the Philipstown River, is 27 feet 6 in. and the distance is 1m. 5f. 16p. See Section *r s*, Bog No. 4.—The fall from the summit of the Bog at G. to the proposed bottom of the main Drain *r s*, is 20 feet, and the distance is 0m. 3f. 0p. and the fall from the summit of the Bog I K, to the proposed bottom of the main Drain *r s*, is 15 feet, and the distance is 0m. 1f. 20p.

The water from the remaining part of Cloncrane Bog, viz. that situated to the west of the summit I K, may be discharged by the main Drain *t u*, into the stream which crosses the road from Esker to Clonbullock at *u*, and runs from thence into the Philipstown River. The average depth of this Bog is 24 feet, almost every part of it is extremely wet; it contains two very considerable Quagmires, one immediately to the south of the Island of Derry Claghan, through the centre of which the line of the main Drain *r s* is proposed to be carried, and the main Drain *t u* is laid out so as to pass through the centre of the other. No attempts worthy of consideration have as yet been made towards reclaiming any part of this Bog.

The principal Proprietors of Cloncrane Bog are the Marquis of Downshire, and Surgeon Hume.

Mount Lucas Bog.

MOUNT LUCAS BOG, or No. 5.

This Bog contains,

	Irish Acres.	Irish.		English Acres.
Of fibrous or red Bog - - - - - -	3,993	4,063,	or	6,582.
Of compact or black Bog, or where Turf has been cut	70			

Its form is extremely irregular, being frequently indented, particularly on the north side, by steep ridges of limestone gravel, some of which project so far into the Bog as nearly to divide into two parts; in some situations where these gravel hills do not occur, the Bog extends northward to the Philipstown River, forming narrow tongues between the hills. It may therefore, be said, that Mount Lucas Bog is bounded on the north, alternately by ridges of limestone gravel, and the Philipstown River.

This Bog is bounded on the south by the high land of Ballyduft, Rapheston and Ballynakill, which separates it from Ballykeane Bog, and in continuation by the gravel ridges, called the Welch Islands, and afterwards by the stream which rises in the Welch Islands, and falls into the Philipstown River at Colliga, which separates it from Clonsast Bog. It is bounded on the east by the Philipstown River which separates it from Cloncrane Bog, and on the west by the high land of Ballynagar.

Mount Lucas Bog is divided in the interior by four small streams, two near the western end, which form the principal sources of the Philipstown River, and two towards the eastern extremity, one of which has its source on the north side of the Island of Derrylask, and the other which is called the Pike Stream rises nearly in the centre of the Bog, a quarter of a mile to the west of the road from Portarlington to Mount Lucas; the Pike Stream takes an eastern course, and having passed the Bog, joins the stream running from the Welch Islands, which falls into the Philipstown River at Colliga.

The waters from the small part of Mount Lucas Bog, situated to the west of the summit L M, may be discharged by minor Drains, as represented in the Map, into three small streams which take a western course; these streams will necessarily require no improvement as they have a considerable fall.

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Mount Lucas Bog.

The summit L M is similarly circumstanced with the summit A B, described in Ballycommon Bog, or No. 1., it is the summit in that part of the Country, as the waters from the west side fall to the River Shannon, and from the east to the River Barrow.*

The streams *v w* and *x y* may, by proper deepening and widening, as represented in the Sections, be converted into main Drains for the discharge of the waters from the Bog between the summits L M, N O, and P Q; the fall from the summit of the Bog at L to the stream at *v* is 40 feet, and the distance is 0M. 4F. 30P. and the fall from the summit at N to the stream at Y is 11 feet, and the distance is 0M. 1F. 20P.

The drainage of the Tongue of the Bog, which extends in a northern direction between the summit P Q, and the Philipstown River, may be effected by minor Drains, as represented in the Map; the fall from the summit P Q, to the Philipstown River is 40 feet, and the distance is 0M. 6F. 20P. See section from the summit P Q to the Philipstown River, Bog, No. 5.

The water from the Bog east of the summit N O, may be discharged by the main Drain *y z*, represented on the Map by double red lines; this main Drain will discharge the waters from the Bog north to the summit R S, into the Philipstown River near Mount Lucas, and to the south of that summit into the stream already spoken of, which rises in the Bog north of the Island of Derrylask, and which having passed the Bog joins the stream from the Welch Islands to the south-east of Derrycreight.

The fall of the main Drain from the summit R S, to the Philipstown River is 24 feet, and the distance is 4 furlongs; and the fall from the summit R S, to the southern edge of the Bog at Brackagh, where the stream from Derrylask flows out of it, is 18 feet, and the distance is 21F. 6in. and the distance is 1M. 3F. 10P. (See Section of the main Drain *y z*, Mount Lucas Bog, or No. 5.) The fall from the summit N O, to the main Drain *y z*, between the letters *o* and *y*, is 29 feet, and the distance is 1M. 2F. The Pike-stream already mentioned, which rises in the Bog west of the road between Portarlington and Mount Lucas, in conjunction with the minor Drains represented in the Map, will be sufficient for the discharge of the waters from the Bog east of the main Drain *y z*.

The fall from the source of the Pike-stream to the Philipstown River at Colliga is 25 feet 6 inches, and the distance is 1M. 4F. 20P. See Section of the Pike-stream, Mount Lucas Bog, or No. 5.

The average depth of this Bog is 21 feet.

There have been some very considerable and successful attempts made towards reclaiming that part of this Bog which is crossed by the road from Portarlington to Mount Lucas, and also between the Island of Derrycreight and the Bog of Clonsast; the origin of these improvements was the beneficial effects which were produced by opening the Pike-stream, and the stream running from the Welch Islands.

The improvements of this part of the Bog are annually increasing, as the Peasants, who live on either side of the Pike-stream, take into cultivation every year a fresh portion of the fibrous or red Bog; the average depth of the cultivated Bog in this part is 14 feet. See Cross Section of the District.

Mount Lucas Bog, or No. 5, contains several Quagmires; the most extensive is situated between the Island of Derrylask and the summit N O.

The principal proprietors of this Bog are, the Marquis of Downshire, the Earl of Charleville, Lord Digby, Colonel Longfield, and Mr. Longworth Dames.

CLONSAST BOG, or No. 6.

Clonsast Bog.

This Bog contains,

	Irish Acres.	Total Irish.		Eng. Acres.
Of fibrous or red Bog - - - - - -	5005	5055	or	8188.
Of compact or black Bog, where Turf has been cut	50			

It is bounded on the north by the improved Bog already mentioned, extending on both sides of the stream running from the Welch Islands, which separates it from Mount Lucas Bog, and by the high land of Clonevoe and Clonadd. On the south, partly by the Cushina River, and partly by steep gravel hills, which frequently occur between the River and the Bog. On the east by the high land of Clonsast, Clonshannon, and Clinmore; and on the west by the high gravel ridges of Tooreen Kilebeg, and Ennaghan, which separates it from the Bogs of Ballykeane and Moanvaghan.

Though this Bog is the largest in this Division of the District, there is but one trivial stream dividing its interior; the stream collects its water from springs issuing from an extensive quagmire, situated to the east of the Derries of Coolagaree; its course through the Bog is very crooked; leaving the Bog, it winds between the hills of Clonshannon and Clonsast, and exhibits the same character from thence to Millgrove, where it joins the Feagile River. Though this stream is small, it forms a deep valley in the Bog, and is therefore a proper

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* The summit in the Bog L M is 30 feet above the summit level of the Grand Canal, and consequently 294 feet above high water mark in Dublin Bay.

Clonsast Bog.

situation for a main Drain. Owing to its extreme crookedness it will be necessary to cut a new course for nearly the whole extent, and also to continue it across the Bog in a western direction, from its source to Bonnaghappagh; the Section of this stream in which the proposed sinkings and widenings are pointed out, is marked "Caffreys Glash, Clonsast Bog, or No. 6."

The fall from the surface of the Bog at Bonnagappagh to Clonshannon is 30 feet, and the distance is 2M. 4F. 0P., and the fall from Clonshannon to the Feagile River at Millgrove is 23 feet 6 inches, and the distance is 1M. 3F. 30P.

The waters from that part of Clonsast Bog, which is situated to the north of the summit V W may be discharged into the Philipstown River by the main Drain *a b*, and the minor Drain *c d*; the fall of the main Drain *a b* from *a*, at the western edge of the Bog to the Philipstown River, is 32 feet, and the distance is 1M. 7F. 0P., Caffreys Glash being very low, will serve as a discharge for the water from the Bog, situated between the summits V W, Y Z, and the summit between Clonshannon and Clonevoe; the fall from W to the stream is 20 feet, and the distance is 0M. 1F. 35P., and the fall from Y to the stream is 23 feet 6 inches, and the distance is 0M. 6F. 10P., and the fall from the centre of the summit between Clonshannon and Clonevoe to the stream is 26 feet, and the distance is 0M. 3F. 20P. The drainage of that part of this Bog, situated to the east of the summit between Clonshannon and Clonevoe, may be effected by the proposed main Drain *e f g*, the water that may run in the northern end of which will fall into the Feagile River, below Clonbullock, and from the southern end into Caffreys Glash; the fall from *f*, which is the highest point of the proposed main Drain, to the Feagile River, is 31 feet 6 inches, and the distance is 1M. 3F. 0P., and the fall from *f* to Caffreys Glash is 36 feet, and the distance is 1M. 0F. 20P. (See section *e f g*, Clonsast Bog, or No 6.) The fall from the summit between Clonevoe and Clonshannon, to the proposed main Drain, is 25 feet, and the distance is 1M. 2F. 0P.

That part of the Bog situated to the south of the summit Y Z may be effectually drained by sinking the minor Drains in the several situations represented by the single red lines drawn on the Map; these several Drains will discharge their waters into the Cushina River; the fall from the summit Y Z, in the line of the minor Drain Y *h* is 46 feet, and the distance is 1M. 6F. 30P.

The water from the narrow tongue of Bog, situated between the Cushina River and the high land of Meelick, may be discharged into that river at Chevy-chase by the minor Drain *i k*, commencing at *i* near the road from Cushina to Ardagh, and ending at *k*, where it joins a Drain already made, which falls into the Cushina River, near its conjunction with the Little Barrow; the fall of this minor Drain from *i* to *k* is 27 feet, and the distance is 1M. 2F. 10P.

The average depth of Clonsast Bog is 20 feet, it contains but one extensive Quagmire, which is the source of Caffreys Glash, as already mentioned.

Some trifling attempts towards improvement have been made on the high edge of the Bog near Clinmore, but they have not as yet arrived at any tolerable state of perfection.

The principal proprietors of this Bog are, the Earl of Rosse, the Earl of Charleville, Lord Ashtown, Mr. Montgomery, and Mr. Nesbitt.

BALLYKEANE BOG, or No. 7.

Ballykeane Bog.

This Bog contains,

	Irish Acres.	Total Irish.		English Acres.
Of fibrous or red Bog, - - - - - - - - -	1030	1125,	or	1822.
Of compact or black Bog, where Turf has been cut	95			

It is bounded on the north by the limestone gravel ridge, extending from Rapheston to Ballynakill, which separates it from Mount Lucas Bog; on the south by a patch of grassy Bog, through which Ennaghan Mill-race runs, which separates it from Moanvaghan Bog; on the east by the high hills of Toreen and Kilebeg, which separates it from Clonsast Bog; and on the west by the high land of Ballykeane and Rapheston.

This Bog is divided in the interior by a small stream which has its source from springs near the northern edge; it runs nearly south, and falls into Ennaghan Mill-race, a little above the Mill. If this stream were deepened and widened sufficiently, it would make an excellent main Drain for the discharge of the water from the Bog west of the summit, marked by the dotted red line; the fall of the stream from its source at *a*, to its junction with Ennaghan Mill race, is 38 feet, and the distance is 1M. 6F.

The small part of this Bog, situated to the east of the summit, may be drained by cutting a minor Drain in the situation represented on the Map; it points to a small stream which runs near the ruins of Ballintemple Church, and ultimately discharges itself into the Philipstown River at Colliga.

The average depth of Ballykeane Bog is 20 feet; it contains but one quagmire, which is at the source of the stream already spoken of.

Some trivial attempts towards improving part of the red Bog have been made at Ennaghan, which have answered very well, having yielded excellent crops of rape, oats, and potatoes.

The principal proprietors of the Bog are, the Earl of Charleville, Mr. Debauda, Mr. Shaw, and Mr. Primrose.

MOANVAGHAN BOG, or No. 8.

Moanvaghan Bog.

This Bog contains,

	Irish Acres.	Total Irish.		English Acres.
Of fibrous or red Bog - - - - -	810	850,	or	1,377.
Of compact or black Bog, where Turf has been cut	40			

It is bounded on the north by the improved Bog already mentioned, which separates it from Ballykeane Bog; on the south by the southern branch of the Cushina River, or the Bogtown Mill-stream, which separates it from Portarlington Bog; on the east by the Hill of Ennaghan, which separates it from Clonsast Bog, and on the west, partly by the high land of Kilcooney, and partly by the gravel hills of Killcappagh.

This Bog is not divided in the interior by any valley or stream; the Bogtown Mill-stream, which, as I have already stated, separates it from the Bog of Portarlington, affords an ample discharge of the whole of its waters, which may be conducted into the stream by minor Drains, cut in those situations represented on the Map; the fall from the surface of the Bog at *l*, to the Bogtown stream at *m*, is 35 feet, and the distance is 1M. 5F. 20P.

This Bog contains no Quagmires; its average depth is 19 feet. Besides the improvements already spoken of on the northern edge, there has been a considerable tract brought into cultivation between the Hill of Ennaghan and the western edge of this Bog, and owing to the great facility of drainage into the Bogtown Mill-stream; it is probable that these improvements will progressively increase.

The principal Proprietors are, Lord Galway, Mr. Smith, and Mr. Hurst.

PORTARLINGTON BOG, or No. 9.

Portarlington Bog.

This Bog contains,

	Irish Acres.	Total Irish.		English Acres.
Of fibrous or red Bog - - - - -	2,895	3,035,	or	4,916.
Of compact or black Bog, where Turf has been cut	140			

It is bounded on the north, partly by the Cushina River and partly by gravel hills, which are interposed between the River and the Bog; on the south by irregular ridges of limestone gravel, which separates it from the Barrow, and prevents the immediate discharge of its water into that River; on the east by the Little Barrow River, and partly by the Hill of Derrylea; and on the west by the gravel ridge extending between Clonequin, Shandra, and Kilemalogue.

This Bog is not divided by any valley or stream; it contains one small island in the interior, which may hereafter be found of great benefit in the reclamation of the Bog.

This Bog contains but one summit, which extends nearly in the centre from one extremity to the other; it is pointed out on the Map by the dotted red line; the waters from the Bog, situated to the north of the summit, may be discharged by the several minor Drains, represented on the Map, into the Cushina River; that to the south of the summit, and west of the road from Portarlington to Cushina, may also be drained by the minor Drains, which are regulated so as to discharge their waters into Drains already made, which join the River Barrow between the upper and lower bridges of Portarlington.

The waters from that part of the Bog which extends south of the summit and east of the road between Portarlington and Cushina, may be discharged by the proposed main Drain *n o*, into a Drain already made, which extends from Derry Lea to the River Barrow.

The average height of the general summit of this Bog above the Cushina River, as appears from the three Cross Sections which accompany this Report, is 21 feet 6 inches, and the average distance is 0M. 5F. 0P. the fall from the Island of Derryounce to the River Barrow is 22 feet, and the distance is 1M. 0F. 0P. and the fall of the main drain *n o* from *n* near Derryvilla Hill to *o*. where it joins the Derrylea Drain is 27 feet, and the distance is 2M. 1F. 28P.; the fall from the general summit in the line of Section to the bottom of the proposed main Drain *n o*, is 20 feet, and the distance is 0M. 2F. 32P.

The average depth of Portarlington Bog is 19 feet, by comparison with other Bogs it may be considered as firm. It contains one large Quagmire; which commences a mile to the west of the Island of Derryounce, and continues from thence nearly in a straight line to a small lake on the northern edge of the Bog; its average breadth is about a quarter of a mile. This Quagmire runs nearly in the line of the summit, at least as far as the Island of Derryounce.

Sir John Macartney, during his residence at Derry Lea, reclaimed a very considerable part of the neighbouring fibrous or red Bog, which now yields annually excellent crops of rape, oats, and potatoes, &c. some improvements have also been made near Cushina. An extensive tract south of Derravilla Hill has been reclaimed; those parts of the Bog which at one period extended to the west of the road from Portarlington to Clonegowan, have also been brought into cultivation and have now become very fruitful.

The principal proprietors of Portarlington Bog are, the Earl of Portarlington, Mr. Stannus, the Reverend William Macartney, Mr. Rice, and Mr. Poole.

Ummerus Bog.

UMMERUS BOG, or No. 10.

This Bog contains,	Irish Acres.	Total. Irish.		English Acres.
Of fibrous or red Bog - - - - - - - - - -	725	785,	or	1,272
Of compact or black Bog, where Turf has been cut	60			

It is bounded on the north and north-west by the Little Barrow River, on the south by the high land at Queensborough, Ummerus Island and the Grand Canal; on the east by the gravel ridge of Clonbrin, and on the west by the Ridge of Pollygarten and Clogheen, which separates it from the Little Barrow River, which runs in a low valley beyond the hills.

This Bog is not divided in the interior by any valley or stream; the drainage of that part of it which is situated to the north of the summit, marked on the Map by the dotted red line, may be effected by making the main Drain *p q*, which will receive the waters from the several minor Drains, represented on the Map by single red lines; this main Drain will join the Little Barrow below the junction of the Cushina River; the fall from the surface of the Bog at P to *q*, on the Little Barrow River, is 37 feet, the distance is 1 M. 7 F. and the Section is marked, "Section of the main Drain, P *q*, Ummerus Bog, or No. 10."

The water from that part of the Bog which extends to the south of the summit may be discharged by minor Drains, as represented on the Map, into a small Drain already made, which falls into the Little Barrow River south of Clogheen; this stream will require deepening in some parts. The fall from the summit of the Bog to the stream, is 26 feet, and the distance is 3 F. 20 P.

The average depth of Ummerus Bog is 28 feet; it contains no Quagmires. Some trifling attempts towards reclaiming part of it near the Canal, have been made, but from improper management they have not answered as well as in other places.

The principal proprietor of Ummerus Bog is Mr. Rice.

Geashil Bog.

GEASHIL BOG, or No. 11.

This Bog contains,	Irish Acres.	Total. Irish.		English Acres.
Of fibrous or red Bog - - - - - - - - - -	390	470,	or	761.
Of compact or black Bog, where Turf has been cut	80			

It is similarly circumstanced with the foregoing Bogs, being surrounded by hills of limestone gravel, with occasional valleys between them, through which the waters from the Bog may be discharged. The enveloping range of Geashil Bog is divided by three of these vallies, viz. at Geashil, Ballycollin, and Ard, to each of which I have laid out minor Drains for the discharge of the water, which are represented on the Map by single red lines.

The summit of this Bog is higher by 21 feet than any other in the District, it is 51 feet above the summit-level of the Grand Canal, and 315 feet above high-water mark in Dublin Bay.

The average depth of Geashil Bog is 26 feet; it contains no Quagmires; no attempts have as yet been made towards reclaiming any part of it.

The principal proprietors of this Bog are, the Marquis of Downshire, and Lord Digby.

Garryhinch Bog.

GARRYHINCH BOG, or No. 12.

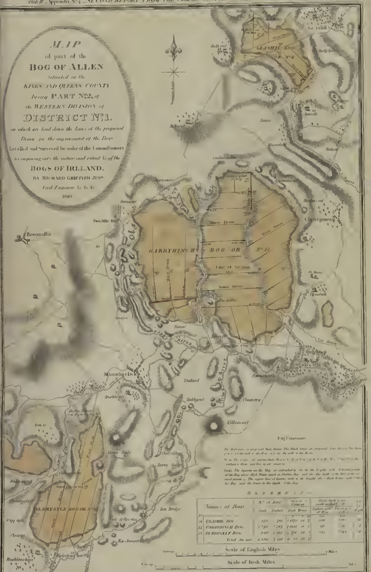
This Bog contains,	Irish Acres	Total. Irish.		English Acres.
Of fibrous or red Bog - - - - - - - - -	3000	3270,	or	5297.
Of compact or black Bog, where Turf has been cut	270			

It is bounded on the north by the gravel ridges of Dernaeart, Garrymore, and Feernamona; on the south and east, by the steep and narrow gravel ridges of Garryhinch, Borness, and Forest, which separates it from the River Barrow, and prevents the discharge of the water from the Bog into the River, excepting at the low passes of Borness and Garryhinch.

The high land of Clanehurk, Clonegowan, and Backwood, forms the eastern boundary.

This Bog is divided into three separate parts, by two streams which flow through the interior; one called the Cottoners Brook, rises on the northern edge of the Bog at Garrymore, and runs nearly south, and falls into the River Barrow at Borness; the other has its source from springs near the northern edge of the Bog at Feernamona; it takes a circuitous course through the Bog, and supplies Garryhinch Mill-race with water; this Mill is placed

close



MAP
of part of the
BOG OF ALLEN
situated in the
KINGS AND QUEENS COUNTY
being PART No. 2, of
the WESTERN DIVISION of
DISTRICT No. 1.
on which are laid down the Lines of the proposed
Drains for the improvement of the Bogs
Levelled and Surveyed by order of the Commissioners
for enquiring into the nature and extent &c. of the
BOGS OF IRELAND.
BY RICHARD GRIFFITH JUNR
Civil Engineer &c. &c. &c.
1810

Explanations

The Red Lines are proposed Main Drains. The Black Lines are proposed Cross Drains. The Arrows point out the fall of the Bog and also the fall of the Rivers.

Note. The course of intermediate Drains [illegible] the [illegible] distance [illegible]

Note. The figures on the Map are intended to show the height of the different parts of the Bog above High Water mark in Dublin Bay and also the depth of the Bog at the several points. — The upper line of figures refer to the height above High Water mark in Dublin Bay and the lower to the depth of the Bog.

REFERENCE

No.	Names of Bogs	No. of Acres Irish	No. of Acres English	Amount of Estimate Irish Money £	s	D	Height above High Water mark in Dublin Bay: highest part of Bog	Height above High Water mark in Dublin Bay: lowest part of Bog	Greatest depth
							Feet	Feet	
11	CLASHIL BOG	470	761	1,070	14	7	309	[illegible]	[illegible]
12	GARRYHINCH BOG	1,570	2,287	7,068	11	1	63	16	1
13	DERRYGYLE BOG	840	1,361	[illegible]78	18	[illegible]	281	48	1
	Total Amount	4,880	7,410	11,55[illegible]	13	7			

Scale of English Miles

Furlongs 8 7 6 5 4 3 2 1 0 1 2 Miles

Scale of Irish Miles

Furlongs 8 7 6 5 4 3 2 1 0 1 2 Miles

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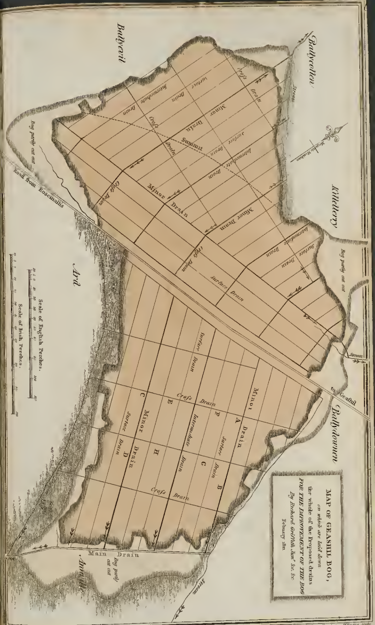
96 Ordered by the House of Commons to be printed [illegible] April 1811



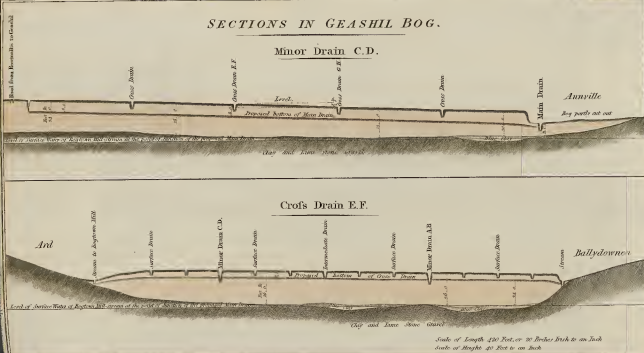
MAP OF GEASHIL BOG,
on which are laid down
the whole of the Proposed drains
FOR THE IMPROVEMENT OF THE BOG
By Richard Griffith Junr. &c. &c.
February 1811

Luke Hansard & Sons Printers *J. Moore sculp*

Ordered by the **HOUSE OF COMMONS** *to be printed, 1st April 1811.*

62

SECTIONS IN GEASHIL BOG.



Minor Drain C.D.

Road from Rosemalis to Geashil
Feet In
24 0
8 0
Cross Drain
26 0
8 0
Cross Drain E.F
Level
Proposed bottom of Main Drain
Cross Drain G H
13 0
Cross Drain
20 0
Main Drain
Annville
Bog partly cut out
Level of Surface Water of Bogtown Mill-stream at the point of Junction of the proposed Main Drain
Blue Clay
Clay and Lime Stone Gravel

Crofs Drain E.F.

Scale of Length 420 Feet, or 20 Perches Irish to an Inch
Scale of Height 40 Feet to an Inch

Luke Hansard & Sons, Printers.—— J. Basire sculp.

96. *Ordered, by* THE HOUSE OF COMMONS, *to be printed,* 1st *April* 1811.

close to the edge of the Bog, and the water is pent up on a level with its surface by a Mill-dam, which is kept in such wretched repair as to occasion the frequent overflow of the Bog. To remedy this inconvenience, I should recommend that a regulating over-fall of sufficient dimensions be placed near the Mill, to discharge the surplus water in wet weather; and also that the banks of the Mill-pond shall be made water-tight.

Garryhinch Bog.

The water from the Mill-pond, having passed the road from Portnehinch to Clonegowan, takes a winding course and falls into the River Barrow, close to the house of Garryhinch; in wet weather the water of this Mill-race adds greatly to the flood in the River Barrow, which is very shallow in that part. In order to avoid this inconvenience, Mr. Warburton of Garryhinch has cut a new course for the water, which commences above the Mill, and ends at the River Barrow, near Launsdown house.

Both the stream called Cottoners Brook, and the upper part of Garryhinch Mill-race, run in very low vallies in the Bog (as may be seen in the Section marked "Longitudinal Section of Garryhinch Bog, or No. 12"); they are therefore the most suitable situations for main Drains, but owing to the great irregularity of their courses, they will require much straightening, deepening, and widening, to render them adequate to the quick discharge of the waters from the Bog in wet weather.

The proposed improvements in these streams are pointed out in their respective Sections; the fall of Cottoners Brook, from the northern edge of the Bog at Garrymore, to its junction with the River Barrow at Borness, is 31 feet, and the distance is 2M. 6F. 30P.; and the fall of Garryhinch Mill-race, from its source to the head of the Mill-dam, is 19 feet, and the distance is 1M. 6F. 10P.; the several minor Drains, together with the main Drain *r s*, represented in the Map, will be sufficient for the discharge of the waters of this Bog into the streams above-mentioned, and also into the River Barrow, where that River happens to be the most eligible point of discharge.

The average depth of Garryhinch Bog is 21 feet; it contains but one extensive Quagmire, which is the source of Garryhinch Mill-stream.

The only improvement worthy of consideration, as yet effected in any part of this Bog, are at Garrymore, which are, however, chiefly confined to the compact or black Bog, where Turf has been cut.

The principal proprietors of this Bog are, the Earl of Charleville, Mr. Warburton, Mr. Meredith, Mr. Sandys, and Mr. Strong.

DERRY GYLE BOG, or No. 13.

Derry Gyle Bog.

This Bog contains,

	Irish Acres.	Total. Irish.		Total. English Acres.
Of fibrous or red Bog - - - - - - - - - - -	780	840,	or	1361.
Of compact or black Bog, where Turf has been cut	60			

Its waters may be discharged through three low passes, which occur between the steep and narrow ridges of limestone gravel, by which, excepting in those situations, it is completely hemmed in. The drainage of that part of the Bog which extends north of the summit may be effected by the minor Drains represented on the Map, which having passed the Bog, discharges its water into a Drain already made, which joins the River Ouness at Derrycloney Bridge; the fall, from the summit to the Drain at the edge of the Bog, is 33 feet, and the distance is 1M. 1F. 30P.

The water from the Bog south of the summit may be discharged by the minor Drains, partly into the stream which runs at the base of the hill of Clonsouhy, and partly into the Tryhogue stream at Kyleclonober; the fall, from the summit to the Tryhogue stream, is 31 feet, and the distance 1M. 1F. 10P.

The average depth of this Bog is 21 feet; it contains no Quagmire; no part of it has as yet been reclaimed, but some Drains have been cut near the edges, for the purpose of rendering the Bog fit for turbary, which owing to its proximity to the town of Mount Melick is very valuable.

The principal proprietors of Derrykyle Bog are, the Earl of Rossmore, Mr. Poole, and Serjeant Moore.

To afford such persons as may not have an opportunity of referring to the several Sections with which I have furnished you, a tolerable idea of the relative heights of the summits and lowest points of the several Bogs, I have inserted the following TABLE thereof. The surface water in the Summit Level of the Grand Canal is Two hundred and Sixty-four Feet above High-Water Mark in Dublin Bay; it is the most prominent feature in the District. I have therefore made it the general point of reference.

TABLE OF HEIGHTS.	Summit Level of the Grand Canal.				Above High-water Mark in Dublin Bay.	
	Above.		Below.			
	Feet.	In.	Feet.	In.	Feet.	In.
BALLYCOMMON BOG, or No. 1.						
The highest point of this Bog is the summit A B, which is	22.	o.	-	-	286.	o.
And the lowest point is near the Philipstown River, opposite Philipstown, it is	-	-	20.	o.	244.	o.
DOWN BOG, or No. 2.						
The highest point of this Bog is near the edge of the Bog below Cherry Garden, it is	-	-	1.	6.	262.	6.
And the lowest point is at Ballyhue, near the edge of Cool Stream, it is	-	-	30.	o.	234.	o.
ESKER BOG, or No. 3.						
The highest point of this Bog is near its northern edge at Leitrim, it is	-	-	10.	o.	254.	o.
And the lowest point is near the edge of the stream below Rathlumber, it is	-	-	46.	o.	218.	o.
CLONCRANE BOG, or No. 4.						
The highest point of this Bog is near the Island of Derry Claghan	-	-	24.	o.	240.	o.
And the lowest point is near the Philipstown River, west of Cloncrane	-	-	53.	o.	211.	o.
MOUNT LUCAS BOG, or No. 5.						
The highest point of this Bog is the summit L M, which is	30.	o.	-	-	294.	o.
And the lowest point is where the Pike Stream joins the Philipstown River	-	-	50.	o.	214.	o.
CLONSAST BOG, or No. 6.						
The highest point of this Bog is the summit V W, which is	-	-	17.	o.	247.	o.
And the lowest point is at K, at Chevy-Chase, it is	-	-	71.	o.	193.	o
BALLYKEANE BOG, or No. 7.						
The highest point of this Bog is at *a*, the source of Ballykeane Stream, it is	-	-	3.	o.	261.	o.
And the lowest point is to the south of Kylebeg near the road, it is	-	-	39.	o.	225.	o.
MOANVAGHAN BOG, or No. 8.						
The highest point of this Bog is at *i*, near the northern edge, which is	-	-	25.	6.	238.	o.
And the lowest point is near the junction of the Bogtown Stream with the Cushina River, it is	-	-	56.	6.	207.	6.
PORTARLINGTON BOG, or No. 9.						
The highest point of this Bog is on the summit to the west of the Island of Derry Ounce, it is	-	-	20.	o.	244.	o.
And the lowest point is at Derrylea near the edge of the Cushina River, it is	-	-	72.	o.	192.	o.
UMMERUS BOG, or No. 10.						
The highest point of this Bog is at *p*, near the Grand Canal, which is	-	-	39.	o.	225.	o.
And the lowest point is where the main Drain *p q*, crosses the road, which is	-	-	74.	4.	189.	8.
GEASHIL BOG, or No. 11.						
The highest point of this Bog on the summit between Ballyevil and Killelleny, which is	51.	o.	-	-	315.	o.
And the lowest point is at the source of the Bogtown Stream, west of Annville	19.	o.	-	-	283.	o.
GARRYHINCH BOG, or No. 12.						
The highest point of this Bog is near the edge of the Bog south of Feernamona, it is	-	-	1.	o.	263.	o.
And the lowest point is near the River Barrow, south of the road between Garryhinch and Borness, it is	-	-	48.	o.	216.	o.
DERRYGYLE BOG, or No. 13.						
The highest point of this Bog is the summit between Derrygyle and Clonsoughy, which is	17.	o.	-	-	281.	o.
And the lowest point, viz. near the road at Derrycloney, which is	-	-	16.	o.	248.	o.

BLACK or COMPACT BOG.

Black Bog.

Besides the 25,358 Irish, or 41,075 English acres of unreclaimed Bog, which have been just described, there is a further extent of 1850 Irish, or 3879 English acres, composed partly of black or compact Bog, either in a state of cultivation, or covered with grass, and partly of fibrous or red Bog, which has been reclaimed.

This black or compact Bog is usually found either in low vallies which connect different Bogs, or in narrow stripes between the fibrous or red Bog, and the enveloping ridge of limestone gravel; these tracts would be considerably improved by the general drainage of the Bogs, as the Drains which must necessarily be cut for the discharge of the water from the fibrous or red Bogs which lies above them, must generally pass through the compact or black Bog, on their way to the River or Stream which runs in the lowest part of the valley beyond the verge of the Bog.

LOW LANDS.

Low Lands

There is also an extent of 740 Irish, or 1,199 English acres of Low Lands, which is situated chiefly on either side of the Little Barrow River, and on the north side of the Philipstown River, near its junction with the Feagile River at Clonbullock. These Low Lands are similarly circumstanced with those mentioned in my Report on the eastern division of this District, and would be equally benefited by the improvement in the courses of the Rivers. The probable annual increase of income that the Proprietors of these Low Lands would derive by the quick discharge of the waters was estimated in my former Report to £. 1 per Irish acre, which estimate is certainly less than might be warranted by the well known fertility of drained Lands, the soil of which is entirely composed of depositions from Rivers.

Therefore the increased annual value of these 740 Irish. acres of Low Lands would be £. 740, which at twenty years purchase amounts to £. 14,800.

NEW ROADS.

New Roads.

Farmers Roads on Bog.

The best situations for making Roads which are intended merely for the purposes of drawing in manure to the Bogs, and transporting the produce from them, is along the sides of the minor Drains. To prevent any interruption from the cross Drains, the surface of the Bog should not be cut in the line of the proposed Road, but passages for the water might be hollowed out beneath the Road. These Bog-Bridges would be sufficiently solid for the common purposes of Farmers Roads, but would not answer for public Roads.

Moss's Road.

In my Report on the eastern division of this District I mentioned a line of Road called Moss's Road, which is laid out in a straight line from the Town of Clane, in the County of Kildary, to Ballinagar, in the King's County.

Some deviations from the marked-out line of that part of Moss's Road, which passes through the eastern division of District No. 1, were proposed in my former Report, to avoid hills and great undulations in the Bog, the same fault is not however to be found with that part which passes through the western division.

Moss's Road, if finished, would not only be of very great benefit to the Bogs through which it passes, but would also be of considerable national importance, by reducing the distance between the Cities of Dublin and Limerick.

Road from Portarlington to Ennaghan.

The line of Road next in importance to Moss's Road, which I should recommend both for the benefit of the Country, and the improvement of the Bogs, should commence on the west side of the upper Bridge of Portarlington, and run nearly in a straight line across the Bog, so as to join the present line of road between Portarlington and Mount Lucas, at the great bend near Ennaghan; the distance between Portarlington and Ennaghan by the present Road is 3M. 6F. 34P.; by the proposed Road it is but 2M. 0F. 6P., which in that short distance would be a saving of 1M. 6F. 28P.

Most of the Bogs contained in the western division of this District are already crossed by public Roads, or have their edges skirted by them; these in conjunction with the Farmers Roads already proposed will be sufficient for the general purposes of agriculture.

Of DRAINING and RECLAIMING BOG.

Drainage is the first step towards the improvement of Bog, and manuring the Surface is the second.

The first and most essential step towards the complete reclamation of Bog is drainage, and the second is the best mode of causing a decomposition of the surface of the Bog when drained, whether by long exposure to the atmosphere, burning, or manure, so as to alter the quality of the boggy soil by any of these means, and thereby render it capable of affording nutriment to a variety of useful plants.

The eastern and western divisions of this District contain 77,505 English acres of Bog.

In my Report on the eastern division of this District, as also in the foregoing part of this Report, the practicability of draining 77,505 English Acres of Bog, which is the total amount contained in the eastern and western divisions of this District, has been I trust satisfactorily proved; and the Expence of drainage, as shown in the estimates, has been found to be trifling when compared with the generally received opinion, that the out-lay in the first instance would be enormous.

Dimensions of Drains.

DIMENSIONS and NUMBER of DRAINS proposed.

In laying out Drains for the discharge of the waters from the Bogs, which compose the western Division of this District, I have thought it necessary to add to the three classes of Drains already proposed in my former Report, a fourth class, which I shall call *Surface Drains*, as I have found from additional experience, that Bog-Fields of 10 Irish acres would be too large for convenience, and also that in certain situations the centre of the Field might remain too wet for agricultural purposes.

Main Drains 14 feet top, 2 feet bottom, and 12 feet deep.

Minor Drains 9 feet top, 1 foot bottom, and 8 feet deep.

The order and dimensions of the several Drains now proposed are, first, main Drains, which are placed in the lowest situations; their dimensions are proposed to be 14 feet top, 2 feet bottom, and 12 feet deep*. In the main Drains, smaller ones, which I have called minor Drains, are proposed to be cut, generally obliquely from the summits of the Bogs to the main Drains, so as to take advantage of the greatest possible fall; their dimensions are 9 feet top, 1 foot bottom, and 8 feet deep; these minor Drains are proposed to be carried at the distance of a quarter of an Irish mile from each other.

Intermediate and cross Drains 6 feet top, 1 foot bottom, and 5 feet deep.

Intermediate between the minor Drains it is proposed to cut Drains of still smaller dimensions, viz. 6 feet top, 1 foot bottom, and 5 feet deep, and further at right angles to the minor and intermediate Drains, a system of cross Drains of similar dimensions with the intermediate Drains is proposed to be carried 280 yards asunder, which would divide the Bog into square fields of 10 Irish acres.

Surface Drains, in conjunction with the others; these Drains will divide the Bog into rectangular patches, containing 3½ Irish acres.

The additional class of Drains now proposed, viz. surface Drains are, intended to divide the 10-acre fields into three parts, by two Drains to be cut parallel to the minor and intermediate Drains, that is, in the direction of the fall.

The whole of the foregoing Drains, if executed, would divide the Bog into rectangular patches 280 yards long, by 93⅓ broad, which is equal to 3⅓ Irish acres.

Dimensions of the Surface Drains are 4 feet top, 1 foot bottom, and 3 feet deep.

The dimensions of the surface Drains are 4 feet top, 1 foot bottom, and 3 feet deep.

The whole of the proposed Drains are laid down in Plate No. 3.

Owing to peculiar circumstances the system of Drains described has not been exactly followed in Geashil Bog.

In the annexed Plate, (No. 3,) containing an enlarged Map of Geashil Bog, the whole of the proposed Drains are laid down in their proper situations, though not exactly according to the plan above described, which irregularity is owing to the public road from Rosmallis to Geashil crossing the Bog between the summit and the principal fall.

This must frequently be expected, as general systems must give way to local circumstances.

It is impossible to lay down any general system of Drains which could be accurately followed in every instance; local circumstances must always be attended to; and every general plan, however perfect, must in some degree arrange itself according to them.

I deem this general system of Drains quite sufficient for that high and porous species of Bog which abounds in this part of the Country, and which in the description of the several species of Bog I have denominated fibrous or red Bog.

It may be apprehended, that porous Bog will become too dry in summer.

This may be avoided by Sluices being placed in the minor Drains.

Some persons may apprehend, that in very hot summers this porous Bog will become too dry, should this ever happen (and I do not mean to say it will not,) Sluices may be placed in the minor Drains so as to pen up the water in them, and in the cross Drains which run nearly at right angles to the fall; by these means the surface of the Bog may be easily moistened, and if it be wished, flooded, and the water will be discharged from one cross Drain into the next, which is on a lower level, and which, according to the plan laid down, should be 280 yards distant; by reference to Plates, No. 3, and 4, at the end of this Report this will appear, more clearly.

Reference to the Plates.

By placing Sluices in the minor Drains A B, and C D, Plate, No. 3, at the points A and C, the waters running in the minor Drains will be backed into the cross Drain E F, and if thought necessary, may be made to flow over the surface of the great Bog-fields south of the cross Drain E F; the water flowing from the cross Drain E F, will be discharged into the cross Drain G H. The fall from the cross Drain E F, to the cross Drain G H, is shown in the Section of the minor Drain C D, Plate, No. 4; it is 2 feet 6 inches.

Practicability of draining wet Bogs has been doubted.

The practicability of draining very wet Bogs has been doubted by many sensible men, from the fact (which is undeniable) that ten or fifteen yards towards the interior from the fall of a Turf-bank the surface of the Bog is frequently found extremely wet, and therefore, (it is said) if the surface of a Bog near the edge of a Turf-bank, (from whence there is always a fall of at least 10 or 12 feet,) be not drained, it cannot be expected that any system of Drains will ever accomplish that end.

Doubts answered.

In answer to this most plausible argument it may be observed, that the surface of all Bogs near the edges is much lower than the interior where the springs are usually situated, which chiefly supplies the water contained in the Bog; the water from these sources naturally flows towards the exterior, which is on a lower level. How can it be expected that Turf-banks formed at the edges of Bogs so situated will prevent the flow of the water from the interior? but owing to the side-cuts usually made, will they not have a tendency to draw more water

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* In my Report on the Eastern Division of this District I have given a Section of the form and description of the Process which I should recommend to be followed in sinking main Drains. See page 33, First Report of Commissioners for Drainage of Bogs in Ireland.

to

Dimensions of Drains.

to those points than would have naturally flowed there? But if the Drains proposed in this Report were cut in any Bog, the water from the interior would be arrested in its progress towards the edge, and quickly discharged by the minor and cross Drains; the natural consequence of the adoption of such a system must be nearly perfect superficial consolidation.

Reaſons for recommending the proposed forms for Drains

In respect to the form which I have recommended for the several classes of Drains proposed in this Report, I have merely to mention that I have been induced to adopt the plan, already detailed, from observing that similar Drains made by the Grand Canal Company in the Bogs of this District have answered perfectly well.

Bog-Drains should be formed so as to keep themselves clean

Their sides should be sloped to prevent their falling in.

The chief desideratum in cutting Bog-Drains is the practicability of forming them in such a manner that they will keep themselves clean, and that their sides will have no tendency to fall in or collapse; the first of these objects may be attained by making the bottom of the Drains sufficiently narrow, that is, proportioned to the quantity of water which is likely to pass through them; and the sides may be prevented from falling in by giving them a sufficient slope; that which I have recommended is 6 inches increase of width on either side for every foot in height. Thus the proposed dimensions of minor Drains are 9 feet top, 1 foot bottom, and 8 feet deep.

Bog-Drains, with perpendicular sides, must necessarily be too broad at bottom, and their sides will fall in if the Bog be wet.

Turf-Banks fall in in winter.

I have seen Bog-Drains made with perpendicular sides, but always in firm Bog. I believe it to be utterly impracticable to form such Drains in very wet Bog; Drains of this description have always a tendency to choke, as they must necessarily be made 3 feet broad at bottom, (if the Drain be 4 or 5 feet deep) to allow the workmen room to throw out the Bogstuff; their sides must also be expected to fall in, unless the Bog be very compact; even Turf-banks, which are always made in the driest and most compact parts of the Bog, frequently fall in in winter, and almost universally crack behind and hang over.

Even Drains, with sloped sides, will in time become narrow at top.

Drains, with narrow bottoms, and sloped sides, are cheaper than those with perpendicular sides.

In fact, every kind of Bog-Drain in time will become narrower at top than when originally formed; those Drains already mentioned, made by the Grand Canal Company, were cut with a shape at least equal to that which I recommend; they have however now become considerably narrower at top. Had they been made originally with perpendicular sides they must have long since fallen in.—Economy too, (which ought always to be a consideration of importance in great works) favours the form of Drain which I have recommended, as Bog-Drains made broad at top and narrow at bottom are much cheaper than those which are made of equal breadth at top and bottom; as the former contains fewer cubic yards in a running perch of work, and the principal part of the excavation is at the surface where no pitching is required.

The minor Drains should be deeper than the cross Drains.

It is necessary that the minor Drains, which are intended to receive the waters from the cross Drains, &c. should be made deeper as well as larger than them, otherwise the water being nearly on a level would have a tendency to stagnate in the cross Drains.

Having thus disposed of the first and principal step towards reclamation, viz. Drainage, I shall proceed to consider the different kinds of Bog which are usually met with, as a different mode of treatment will be found expedient for each sort.

Description of the Different KINDS of BOG which are found in this Country.

In this part of the Country two distinct species of Bog may be observed, which I shall denominate fibrous or red Bog, and Quagmire, and compact or black Bog.

I am fully aware that the naming any thing by its predominant colour has been much disapproved of by men of science, as being too vague; I am, however, induced to persist in this mode, in hopes of being better understood by country Gentlemen and Farmers, with whom the names of Red Bog and Black Bog are perfectly familiar.

Fibrous, or Red Bog,

Is the most predominant species in this country.

It is chiefly composed of the Sphagnum Palustre or Bog-Moss.

Fibrous or Red Bog is the most predominant species in this Country; in fact the chief part of the surface of most of our extensive Bogs is composed of it; on minute examination it appears to be almost entirely composed of fibres of the Sphagnum Palustre (or Bog-Moss), in a very perfect state; its external appearance is usually reddish brown, when dry its colour is darker, and approaches to clove brown, in this state it is usually covered by common heath (Erica Vulgaris) which gives it at a distance an olive, or, if in blossom, a pinkish, hue.

When very wet this species of Bog assumes a greenish colour, owing to its being covered by various kinds of Moss, (but chiefly the Sphagnum Palustre) which grow luxuriantly on the surface.

In the section of the Turf-bank in Turraboe Bog, which with its description, &c. forms the appendix to my former Report, it may be observed that the fibrous Moss continues from the surface to the depth of 10 feet, below which point the fibres become less perfect, and the gradation of colour, as well as the distinctness of fibre, continue progressively, the one increasing and the other diminishing without any interruption, (if we except the adventitious interposition of a thin stratum, chiefly composed of twigs of Alder and Birch trees) between the Red and the Black Bog, the several varieties of which latter form the lower strata of that section.

In all Bogs, where the upper Surface is composed of Red Bog, we

From hence it appears that in all Bogs where the upper part is composed of Red Bog, we may expect to find the lower composed of Black Bog, and in this supposition, we are may expect the lower part to be composed of Black Bog.

borne out in the observation that those parts of the Bog which extend on a lower level, beyond the edge of the high Red Bog, where Turf has formerly been cut, are universally found to be Black Bog.*

Of Quagmire.

Quagmire.

Quagmire is only a variety of the red Bog: I have given this denomination to those parts of the red Bog which are so wet and soft as to render their interior nearly inaccessible; where they occur, the Bog is usually shallow, it seldom exceeds 14 feet in depth, and rarely amounts to 20 feet.

Quagmires usually occupy the most elevated situations in the Bog

They are the seat of Springs.

Tufts of Grass and Bushes are found growing on the Surface.

They frequently occupy the most elevated situations in the Bog, and diverge from thence by winding courses of irregular breadth towards the edges. The interior of these Quagmires is usually the seat of springs, to the nutritious particles contained in the waters of which may be attributed the growth of tufts of the white grass, or soft meadow-grass (Holcus Lanatus) and the fiorin or jointed-grass, and also to stunted trees or bushes of alder and birch, which are universally met with in the very wettest Quagmires.

Of Compact or Black Bog.

Compact, or Black Bog,

Has sometimes a strong resemblance to Pitch, for Pitch Coal.

It contains rarely any vegetable remains.

Black Bog is supposed to have grown slowly under Water, and that the Red Bog commenced growing when the Black Bog had reached the surface of the Water.

The colour of this species of Bog varies from deep reddish brown to jet black; in the latter case the mass is perfectly compact, and has a strong resemblance to pitch or pitch-coal, the fracture being conchoidal in every direction, and lustre glistening. This kind of Bog contains very rarely any vegetable remains; where they do occur I have always found them to consist of some of the varieties of rushes which grow in stagnant waters; from hence we may be led to conclude, that black Bog was formed, or grew slowly, under water, which will perhaps sufficiently account for the great difference of composition that exists between that species of Bog and the red Bog, which we may suppose to have commenced growing when the black Bog had reached the surface of the water, and to have since continued to vegetate, and to have annually increased in height above the water, and consequently above the level of the discharge, being constantly supplied with sufficient moisture by rain, or by capillary attraction from the water below. This supposition is strengthened by the fact, that twigs and branches of trees are sometimes found irregularly scattered at the point of junction of the Red and Black Bogs see Section of the Turf-bank in my first Report.

It is sometimes found unaccompanied by Fibrous, or Red Bog.

Compact or black Bog is frequently met with, unaccompanied by fibrous or red Bog, but in such cases it seldom forms great tracts; it is generally found in narrow strips, between the base of the gravel-hills which surround the Bog, and the abrupt edges of the red Bog, which rises frequently at an angle of 45° to the height of 15 or 20 feet above the surface of the black Bog. It is generally covered by a scanty coat of grass, which is of very little value on account of the great quantity of water by which it is overspread; in any part where the water is less abundant, or where it has been entirely, or even partially, discharged by drainage, the natural grasses may be observed growing; and on minute examination white clover may sometimes be found vegetating amongst the grass.

In those situations where Turf has been cut, black Bog, as above observed, is universally found; as the Turf-cutters are frequently prevented by the want of sufficient Drains from cutting deep into the black Bog, they necessarily leave the greater and by far the most valuable part of it behind them, as it is invariably found that the compactness of the Bog increases with its depth, and the more dense the Turf, the hotter and more durable is the fire.

I shall now proceed to consider the several properties of the different manures which the Country affords, and which may be advantageously used in the reclamation of Bogs.

Manures.

Of the several Manures which the Country affords.

In treating on this subject I shall confine my observations entirely to the different fossil or earthy manures which are to be met with, either in the Bogs themselves, or in their immediate neighbourhood. The most important of which are,

Lime and Limestone,
Limestone Gravel,
Tenaceous or Blue Clay, and
Turf Ashes.

Of Lime and Limestone.

Limestone.

It is composed of nearly equal parts of pure Lime, and Carbonic Acid Gas.

Carbonate of Lime or common Limestone, is a mild substance, nearly insoluble in water; it is usually composed of nearly equal parts of pure lime and carbonic acid gas, or fixed air; this aerial acid is very volatile; heat, when applied by the well known process of burning lime, will easily expel it; in this state it is said to be caustic.

Lime.

Caustic or quick-lime, when exposed for some time to the action of the atmosphere, or to animal or vegetable substances (which it quickly dissolves) attracts a greater proportion of carbonic acid gas than it contained previously to its being calcined, in this state it becomes again mild.

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* I had intended to have given in this Report a perfect Analysis of the different varieties of fibrous and compact Bog, but a personal accident has prevented me from accomplishing it in time.

The most simple mode of discovering whether Lime retains any degree of causticity, that is, whether it be or be not perfectly saturated with carbonic acid gas, is by applying a moistened piece of paper, stained yellow with turmeric to the surface of the Lime, if it be caustic, the colour of the paper will immediately be changed from yellow to red, if mild, no such effect will take place.

Process of discovering whether Lime be or be not caustic.

When water is poured on caustic-lime it quickly loses its compact form, and falls into a nearly impalpable powder; this substance is usually called slacked-lime, by Chemists Hydrate of Lime.

Slacked Lime.

Lime is not rendered less caustic by being slacked; the quantity of water which it absorbs, amounting generally to about one third of its weight, has no other effect than that of dividing its particles; on exposure to the air the water contained in slacked-lime is quickly expelled, and carbonic acid gas is absorbed from the atmosphere, lime having a stronger affinity or attraction for carbonic acid gas than it has for water.

Lime is not rendered less caustic by being slacked.

Caustic or quick-lime is the best state in which that substance can be applied as a Manure to boggy soils, as it has the effect of quickly dissolving the vegetable substance with which it is placed in contact.

Caustic Lime is best suited to the improvement of Bog.

In the process of decomposition the vegetable substances give out carbonic acid gas which is attracted by the lime; the lime thus becomes mild, and is rendered capable of affording nutriment to plants, by gradually giving out the fixed air which it had absorbed from the decomposing Moss.

This process does not render the lime again caustic, as fixed air is as quickly attracted from the atmosphere as it is absorbed by the plants.

Mild Lime when used as a Manure on Bog, has no effect in decomposing the Moss, it therefore remains dead till called into action by the growth of plants.

Mild Lime has no effect in decomposing the surface of Bog.

For the same reasons that caustic or quick-lime is the best mode of applying that substance as a Manure to Bog, it is improper for upland, particularly when used as a surface dressing on grass; a very dirty fallow might however be benefited by a cautious admixture of caustic-lime, as it would have a tendency to dissolve the roots of noxious weeds.

Lime combined with carbonic acid is not the only state in which that substance is found in quarries; Gypsum (that is lime combined with sulphuric acid) is found in considerable quantities in the north of Ireland, but has not been met with, nor do I believe it exists, in quarries in the Provinces of Leinster or Connaught.

On this account it is not necessary to dwell on its effects in this place as a Manure; I shall only add that where it has been used in large quantities it has been found destructive to vegetation.

Gypsum.

Has not been found in Quarries in the provinces of Leinster and Connaught.

Carbonate of lime is sometimes found combined with carbonate of magnesia; this compounded rock, when heated, gives out its carbonic acid gas more quickly than common limestone, but attracts it from the atmosphere, and from decomposing plants much more slowly.

Magnesian Limestone.

Mr. Professor Davy, in his late admirable course of Lectures, (delivered in the Laboratory of the Dublin Society,) on the application of Chemistry to agriculture, observed, that magnesian limestone when rendered caustic, may perhaps be considered as superior to common caustic-lime as a Manure for Bogs, as its effects would be more lasting for the reasons above stated, namely, that it requires a much longer time to become saturated with carbonic acid gas.

Caustic Magnesian Lime is superior to common Caustic Lime, as a Manure for Bog.

The mode of ascertaining whether Limestone contains any Magnesia or not, is very simple, viz. throw a small portion of Limestone, coarsely powdered, into a glass containing dilute Muriatic Acid, (spirit of Salt,) or dilute Nitrous Acid, (Aqua Fortis,) if the stone contains much Magnesia a weak effervescence will take place, and a white cloud will be formed in the liquor; but if it contain none, the effervescence will be very strong, and the solution, if the Limestone be white, greyish white, or blue, will be nearly colourless; if the Limestone be black, the solution will necessarily be black, owing to the colouring matter of the stone, which in the instance of Kilkenny Marble contains from one half to one per cent of carbon or coaly matter.

The mode of ascertaining whether Limestone contains any Magnesia.

Limestone Gravel.

It appears from the descriptions given in my former and present Report, that the whole of the Bogs in this District are surrounded by abrupt ridges of limestone gravel; and also from the Sections, that in every instance this substance is found immediately below a thin stratum of blue clay, which is interposed between it and the bottom of the Bogs.

The hills of limestone gravel differ materially from each other in the size of the rolled masses of limestone of which they are chiefly composed, and may be classed in the following manner, viz.

Limestone Gravel.

First.—In

First variety.

First.—In some instances these rolled masses exceed three feet in diameter, where such occur, clay mixed with small limestone gravel, or rather limestone sand, is usually found interposed between them.

Second variety.

Second.—Extensive ridges of rolled limestone are sometimes found perfectly free from any admixture of clay or other foreign substance, in this case the rounded pebbles are nearly of an equal size, seldom exceeding three inches in diameter, and rarely less than one; these ridges have a strong resemblance to the rounded strong masses which form the edge next the land of a rocky sea-beach, and evidently had their origin from eddies formed by strong currents of water running in nearly opposite directions.

Third variety.

Third.—Hills composed of strata of limestone gravel, or rather of limestone sand, are also frequently met with; though the stratification is not perfectly regular, still the beds are very distinct from each other, and usually differ very materially both in their composition and in the size of their particles: some (particularly the upper beds) contain much clay, whilst others are perfectly free from that substance, having little or no tendency to sully clear water when thrown into it.

First variety used as manure.

These three varieties of limestones gravel are applicable to three different uses: The clay mixed with limestone gravel or limestone sand contained in the first class, and also in the upper part of the third, has long been known as an admirable manure for the production of wheat, the Farmers in this country call it corn or manuring gravel; this substance has also been employed with signal success in the reclamation of fibrous or red Bog, of which I shall hereafter speak more at large.

Second variety used in making Roads.

The second variety of limestone gravel is used chiefly in the formation of Roads, and is admirably adapted to that purpose, but if used in forming Roads on Bog it ought to have a sole or sub-stratum of clay and branches of trees (if they can be procured) first laid on to prevent its sinking unequally, or mixing with the upper surface of the Bog.

Third variety used in building.

The pure beds of the third variety are usually employed in building, and from their being perfectly free from clay, form, when not overcharged with lime (a caution rarely observed) perhaps the hardest mortar that we are acquainted with.

Tenacious or Blue Clay.

Tenacious, or Blue Clay, forms the immediate substratum of the Bogs.

This substance is found almost universally forming the immediate sub-stratum of the Bogs in this country; it is generally perfectly free from gritty or stony particles, where they occur, it comes under the class of corn or manuring gravel.

It is an excellent Manure for Red Bog.

Blue clay is an excellent manure for fibrous or Red Bog, it fills up the interstices, and gives compactness and solidity to the surface, and owing to its quality of retaining water prevents this porous species of Bog from becoming too dry in summer.

Of Turf Ashes.

Ashes.

This substance is divisible into three distinct species, viz.

White Ashes, Yellow Ashes, and Red Ashes.

White Ashes.

White Ashes are of little or no value as a Manure.

As a manure this kind of ashes is of little or no value, at least it has hitherto been found impossible to collect it into a sufficient body to bring its useful properties into action on a large scale.

Yellow Ashes.

Yellow Aſhes are much esteemed as a Manure for Black Bog.

By yellow I mean that which remains from the burning of that variety of compact or Black Bog which contains lime.

Yellow ashes are much esteemed as a Manure both on compact Bog and upland; they will give excellent crops of rape, potatoes, oats, &c.

Red Ashes.

Are considered rather superior to yellow or earthy ashes as a manure, they have however nearly similar effects in the production of crops.

Red Aſhes are also excellent on Black Bog.

The whole of the foregoing Manures may be applied beneficially to every species of Bog, but the degree of their effect will be proportionate to the capability which the Manure possesses of counteracting any injurious qualities which the Bog may contain in itself, or by adding a substance which may bring its native valuable qualities into action. I shall now therefore take into consideration the effects which these several Manures will exert on each of these species of Bog.

APPLICATION of the foregoing Manures to the different kinds of BOG.

Manure best suited to the improvement of Red Bog.

Manures suited to Red Bog.

This species of Bog when first drained is extremely porous and open in its texture, on which account it is liable to become so dry in summer that the natural grasses which in spring had vegetated on its surface, frequently die from want of moisture; from the absence of water and by long exposure to the atmosphere, the surface of the Red Bog is descomposed; the mass is thus rendered more compact, and becomes capable of supplying food and moisture to plants in dry weather; this operation of nature, though certain, is however very tedious.

Surface is decomposed by exposure to the Atmosphere

I shall therefore submit to your consideration, the means we have in our power of quickening her pace, and of rendering the improvements more perfect.

That species of limestone gravel which is called corn or manuring gravel is the most efficient Manure with which we are acquainted for creating a rapid and lasting improvement on the surface of fibrous or red Bog.

Corn Gravel is the most efficent Manure for creating a lasting improvement on Red Bog.

Two modes of applying this substance are practised,—the first, is by merely spreading gravel on the surface of the Bog when drained. Its effects are manifest, they are superior, although somewhat similar, to those ascribed to tenaceous or blue clay, to which must be added the nutritive qualities of the lime contained in the gravel, which gives out its fixed air to the plants which are supplied with moisture by the clay in very dry weather, and are thereby kept alive.

First mode.

Some farmers plough or dig up the Bog, previous to spreading the gravel, and afterwards gather the whole into heaps and burn them, a very valuable and heavy kind of aſhes is thus formed, which is composed partly of white ashes, partly of burned clay, and partly of caustic or quick-lime.

Second mode.

The quick-lime immediately acts on the red Bog and dissolves it, but the clay loses its tenacity by being burned, and is thereby deprived not only of its quality of retaining water, but of its tendency to remain on the surface of the Bog; the whole of the ashes having no check will naturally descend through the open fibres of the Moss, and in a few years they will have sunk so far that the surface will be deprived of their beneficial effects.—If this reasoning be just, the second mode of proceeding, namely, by burning, should be deferred a few years, or until the surface of the drained Bog should have so far subsided as to become sufficiently solid to retain water, and to prevent the passage of the aſhes downwards; In such circumstances the most beneficial effects might be expected from burning the surface of the Bog.

The second mode of proceeding should be deferred till the surface of the Bog has become solid.

Tenaceous or blue clay comes next in the order of valuable Manures, for the improvement of fibrous or red Bog, its effects have been already described, caustic or quick-lime might be added with great advantage in conjunction with the clay, as it would dissolve the surface of the Bog, and would be prevented from passing through the fibres of the Moss, by the tenacity of the clay.

Blue Clay is a good Manure for Red Bog.

For the reasons already stated, it is almost unnecessary to add that caustic lime should not be used alone as a Manure on fibrous or red Bog, but should always be accompanied by clay or corn gravel.

Caustic Lime should not be used alone as a Manure on Red Bog.

No very beneficial, or at least, no permanently good-effects can reasonably be expected from the application of either yellow or red ashes alone as a Manure, on the surface of a red Bog when drained, as these substances, unless accompanied by corn-gravel or by clay, would almost immediately pass through the fibres of the moss and be lost.

No very beneficial effects can be expected from the application of aſhes alone, as a Manure on Red Bog.

Improvement of Quagmire.

Though this species of Bog is the wettest and least inviting of any, when in its native state, it is more easily drained, and becomes profitable with less expense than any other.

Improvement of Quagmire.

Shortly after the excess of water has been discharged, a thick coat of sweet grass usually springs up; if it be wished to raise crops on it, the same Maunres which are proposed for the reclamation of red Bog should be resorted to, and the same precaution observed to prevent the effects of porosity on account of the open texture of this Bog.

Manures, similar to those proposed for Red Bog, should be resorted to.

Manures best suited to the Reclamation of Black Bog.

The principal difference which exists in an agricultural point of view, between fibrous or red Bog, and compact or black Bog, is the extreme porosity of the one, and the density of the other; their treatment must be therefore extremely different.

The Manure which has been found most efficacious on this species of Bog is ashes produced from the burning of this substance itself; if it be wished to cultivate grass for meadow or grazing, lime is very beneficial; if the boggy soil be in fallow; the lime ſhould be caustic, if it be intended only as surface-dressing on grass, it should be mild; if clay or limestone gravel be used, they should be gathered into heaps and burned along with the surface of the Bog, so as totally to destroy their power of retaining water, to which this species of Bog is too much disposed.

Yellow or Red Ashes are the best Manure for the improvement of Black Bog.
Lime used.

When black or compact Bog has been long subjected to annual cultivation it loses its compactness and becomes very friable, when this happens, limestone gravel or clay may be beneficially resorted to.

Long cultivation renders Black Bog friable.

Cultivation of Bog.

I have thus endeavoured to lay before you a general description of the different species of Bog, and also of the different Manures which the country affords, pointing out as far as the

Manures.

experience of others and my own observation could guide me, the particular effects which each kind of Manure might reasonably be expected to have on the different species of Bog.

Crops best suited to Bog cultivation.

I shall now lay before you some general remarks on the crops and grasses which appear to be best suited to Bog cultivation, together with a statement of the process (accompanied by an estimate of the expense thereof,) which I should recommend for the complete reclamation of red Bog.

Rape.
Oats, Potatoes, and Rye.
Hemp has been tried, but did not always succeed.

Rape appears to be the most favourite crop, at least in the commencement; Oats, Potatoes, and Rye are found to answer nearly as well; the latter is, however, frequently good when the other crops fail. I have seen Wheat tried on the surface of very deep red Bog; the produce was tolerably good, but the grain was not full; Hemp has been tried by many persons with various success; where failures have occurred, they are perhaps attributable more to ignorance of the mode of cultivation, and the proper method of saving and drying, than to any imperfection in the boggy soil. It is to be observed that this plant likes a deep soil, but will not thrive in wet; unless, therefore, the Bog shall have been previously completely drained, the soil (to some depth) turned up, and exposed to the atmosphere, and intermixed with limestone gravel, there can be little hope of obtaining a valuable crop; but with these precautions the best success may be expected.

Extract from Mr. Nasmith's Essay on the Properties and Uses of Peat.

Mr. Nasmith, of Hamilton, in his Essay on the Properties and Uses of Peat, gives the following description of the several species of Grass which have been known to grow on boggy soils:

" Anthox-anthum odoratum (sweet-smelling early meadow-grass or vernal grass) is found
" scattered every where on Peat-grounds where land-water has flowed; it is a valuable
" grass, palatable to the cattle, springing early, and putting forth abundance of new leaves
" through the summer."

" Alopecurus pratensis (meadow fox-tail grass) grows in similar places, and is valuable
" for Hay and Pasture.

" Poa pratensis (great meadow-grass) and Poa trivialis (common meadow-grass) are
" grasses to which a Peaty soil is highly agreeable; they propagate very fast in it; cover the
" surface with a close Turf, and are excellent Grasses, very productive both of Hay and
" Pasture.—Cynosurus Crystalus (crested fox-tail grass) I have not unfrequently seen about
" the borders of a Peat-field; it abounds in the best pastures, and cattle are fond of it.

" Children might be taught to know these plants, and collect the heads as soon as the
" seeds were ripe, two or three years before a field was to be sown; these seeds sown on a
" piece of well-prepared ground, each species by itself, would soon produce a stock, which
" might be preserved till it was wanted.

" Trefolium repens (white Clover) abounds much on Peat with which earth has been
" mixed; its value for Pasture is well known, and as its seeds are to be had in the shops it
" ought not to be omitted.

" Sathyrus Pratensis (common yellow flowering vetchling, or tare everlasting) I have
" sometimes, but not frequently, seen about the borders of a Peat-field; it is valuable fod-
" der; and as it is very prolific, its seeds might easily be gathered; and trial made of it
" would succeed.

" Lotus corniculatus (Bird's-foot trefoil, has a yellow flower like that of broom, and
" leaves with three lobes) is the only other plant of the diadelphia class, which I recollect
" abounding on Peat-grounds; it has been much extolled as food for cattle, but they seem not
" fond of it while green; it is not rejected in hay, and is perhaps eaten when other grasses
" fail; as it is congenial to a Peat-soil, and grows to a good size, it should certainly be
" adopted.

" Trefolium pratensis (meadow fox-tail) the cow-grass of the English farmer puts out
" many horizontal roots from the main one, and would probably keep hold of a Peat-soil;
" if it should succeed it would make a valuable fodder, and therefore merits a trial."

Expense of Reclaiming Bog, so as to render it worth £.1. 10*s.* per Acre.

Expense of re-claiming Bog.

In respect to the mode by which the Bogs when drained shall be brought into profit, by distributing on the surface the Manures above-mentioned, much will depend upon the relative circumstances of each particular Bog, in respect to the distance of the gravel, clay, or lime to be laid out upon it.

In some situations it may be found expedient, by placing stop-gates at the main Drains, to dam up the water, and thereby to make temporary Canals, whereupon the Manure may be conveyed on floats into central situations, and from thence, either in times of frost, or after some continuation of dry weather, it may be distributed by carts or wheel-barrows upon the surface of the Bog. I understand that Mr. Edgeworth has (in such situations) recommended the use of movable temporary rail-ways; and I am fully pursuaded, that if they be constructed upon a simple plan they will be found to diminish the expense, and considerably to facilitate the progress of the work: but these are only general, and perhaps obvious suggestions. The practical improver will expect closer and more distinct views of the subject, particularly in regard to the amount of the expense, and the probable return to be expected in the course of 3, 4, or 5 years, for the original out-lay; I shall therefore give what appears to me (upon the best information I have been able to obtain) a fair and candid prospectus of such an undertaking.

I should

Reclaiming Bog.

I should reccommend that after the several Drains suggested by me shall have been completed, that the Bog should be suffered to remain for eighteen months, or perhaps two years, to subside; during which time it will be necessary to employ a sufficient number of labourers, under the direction of a competent Overseer, to remove obstructions, and to keep the Drains in perfect repair; in estimating the Drains I have increased the price per cubic yard, to cover this Expense.

This I consider to be a very important part of the system, and in very wet Bogs it will require much attention, at least for the first year.

That part of the Bog which lies nearest to the clay or gravel, will of course be brought into profit at a smaller expense than that which lies more distant, the estimate must therefore be formed upon the average expense of manuring a given number of acres; suppose a square of 400 acres, divided into twenty equal parts, by main, minor, and cross Drains, and communicating with each other, wherein the water in some instances may be occasionally dammed up by stop-gates, and the whole when necessary brought nearly upon one level as above-mentioned.

The gravel and clay may be deposited by narrow floats on the borders of the several divisions.

The first process ought to be to form roads along the edges of the Drains sufficiently strong to bear the weight of small carts; and again I must recur to the superior advantage in this process to be derived from the plan of wooden movable railways.

The first object should be to form Roads. Wooden movable Railways would be very useful.

I am next to consider the quantity of manuring-gravel which would be sufficient to cover an acre of Bog, in order to render it capable of producing a good crop of Rape, Potatoes or Oats, or rather a succession of these three crops, without any further addition of Manure than the Ashes that would be produced by a light or partial burning of the surface. I should suppose that six loads to the perch, of gravel, (each load containing about seven hundred weight,) would be amply sufficient to cover each acre, together with a slight top-dressing of Ashes, or (if more convenient) of quick-lime, say one thousand loads, or three hundred and fifty tons of gravel to the acre, I should calculate, that upon a general average, each load could be laid on the Bog at an expense of about four-pence per load, or £. 16. 13*s*. 4*d*. per acre, and that the top-dressing of caustic-lime would cost about £. 6. per acre more, to which add the expense of planting and digging out an acre of Potatoes £. 10. I would recommend a second crop of Potatoes to follow the first, in which case the produce of the second year will be found greatly superior to that of the first; the third year a crop of Oats, and to lay down the land with Hay-seed; fourth year Meadow, without any additional expense.

1000 Loads of Gravel, equal to 350 tons, are proposed to be laid on the Bog.
The Expence would be £ 16 13*s*. 4*d*. per acre.
Caustic Lime £ 6.
Planting and digging, &c an acre of Potatoes £ 10.
A second Crop of Potatoes should follow the first. 3rd year a crop of Oats. 4th year Meadow.

If I am not greatly mistaken, the Bog so treated would be completely reclaimed, and would, in its then state, be well worth £. 1 10*s*. per acre per annum.

The Bog would then be worth £ 1. 10s per acre.

There is another rotation of crops which I should prefer to the foregoing, and which is also frequently practised, with the exception, however, that the large quantity of clay and gravel which I have recommended is seldom if ever afforded to the Bog in the first instance, and on which increased quantity I build my expectation of *perfect* reclamation, by forming a solid upper stratum on the Bog, without which the plough can only operate at particular seasons, and even then with danger and difficulty to the cattle.

Another rotation of Crops.

After the One thousand loads of gravel as above stated shall have been laid out and spread, the whole should be lightly ploughed, and after a slight top-dressing of lime, or of red ashes, which latter may be easily produced by burning the surface of the nearest red Bog, a crop of Rape should be sown, to be succeeded with one crop of drill Potatoes, Oats, and Meadow, and as soon as the hay shall be mowed, about two hundred and fifty loads of gravel or clay per acre should be laid out and spread upon the surface. This process would leave the land (for such I might then call it) in a state of great power and vigour, and infinitely more profitable to the farmer for Tillage, Meadow, or Pasture, than most of the uplands in the neighbourhood. I might venture to say that after the above process, including the second top-dressing of gravel, the value of the Bog to the farmer would far exceed (but I shall state it at no more than) £. 1 10*s*. per Irish acre.

1st Crop Rape.
2d Crop Potatoes in Drills, to be followed by Oats and Meadow.
An additional Covering of 250 Loads of Gravel proposed.

Reclaimed Bog valued at £.1 10*s*. per acre.

In order to place my ideas on this subject in a clear point of view, I take the liberty of laying before you a prospectus of the probable expense of the two modes of cultivation above suggested, together with the annual return to be expected from the several crops in the process of four years cultivation; and for the purpose of perspicuity I have made my estimates upon a single average acre, and afterwards formed my conclusion upon the result of four hundred acres under similar treatment.

Prospectus

First proposed rotation of Crops.

1st year, Potatoes in lazy beds.
2d ditto, ditto ditto.
3d ditto, Oats, laid down with Hay Seeds and White Clover.
4th ditto, Meadow.

Second proposed rotation of Crops.

1st year, Rape.
2d ditto, Potatoes in Drills.
3d ditto, Oats, laid down with Hay-Seed and White Clover.
4th ditto, Meadow, immediately to be followed by a slight covering of gravel.

Prospectus.

D^{r} - - - and - - - C^{r} - - - on first proposed Rotation of Crops.

	£.	s.	d.	£.	s.	d.
Dr.—or Outlay.						
First Year.						
Putting out 1,000 loads (7 cwt. each load) of Gravel, per Acre, at 4*d*. per load - - - - - - - -	16	13	4			
Spreading the gravel - - - - - - - -	0	10	0			
Top-dressing of lime - - - - - - - -	6	0	0			
Seed, 8 barrels at 5*s*. per barrel - - - - - -	2	0	0			
Planting second covering, digging out and gathering - -	8	0	0			
per acre	33	3	4			
Add Interest for 9 months on £. 33 3*s*. 4*d*. at 6 per cent. per annum - - - - - - - - - -	1	9	10			
				34	13	2
Second Year.						
Seed, planting, second covering, digging and gathering, per acre	-	-	-	10	0	0
				£.44	13	2
Third Year.						
Two ploughings and harrowings - - - - - -	2	0	0			
Harrowing with grass harrows, and rolling after the sowing of the Hay-Seed - - - - - - - - - -	0	15	0			
Seed-Oats, one and a half barrel, per acre, at 15*s*. per barrel -	1	2	6			
Hay-Seed and white Clover.						
12 barrels of white Hay-Seed - - - - - - 1 16 0						
12lb. of red and 4lb. of white Clover - - - - 1 2 9						
	2	18	9			
per acre	-	-	-	£. 6	16	3
Fourth Year.						
Meadow no expense.	-	-	-	-	-	-
Total expense of 4 years cultivation, per acre - - -	-	-	-	£.51	9	5
Cr.—or Return.						
First Year.						
60 barrels of Potatoes, at 5*s*. per barrel - - - - -	15	0	0			
Second Year.						
80 do. at 5*s*. per barrel - - - - - - -	20	0	0			
Third Year.						
14 barrels of Oats at 14*s*. per barrel - - - - - - Besides Straw, which pays for reaping, threshing, &c. &c. &c.	9	16	0			
Fourth Year.						
Meadow, the price at which it would set per acre - - -	5	0	0			
Total return from 4 years cultivation, per acre - - -	-	-	-	£ 49	16	0
Total Loss on 4 years Cultivation. of Bog per acre - - -	-	-	-	1	13	5
			£.	51	9	5

After which, the Ground would let for at least £.1 10 *s*. per acre per annum.

D^{r} - - - and - - - C^{r} - - - on Second Rotation of Crops.

	£.	s.	d.	£.	s.	d.
Dr.—or Outlay.						
First Year.						
Putting out 1,000 loads (7 cwt. each load) of gravel, per acre, at 4*d*. per load. - - - - - - - - -	16	13	4			
Spreading do. - - - - - - - - -	0	10	0			
Lime and red ashes - - - - - - - -	5	0	0			
Spreading the lime or ashes - - - - - -	0	5	0			

(continued.)

Prospectus.

(continued.)	£. s. d.	£. s. d.
One ploughing - - - - - - - - -	0 18 0	
Rape-Seed and Sowing - - - - - - -	0 5 0	
	23 11 4	
Add Interest on the above outlay for 18 months at 6 per cent. per annum - - - - - - - - -	2 2 5	
Expense per acre	- - -	25 13 9
Second Year.		
Potatoes in Drills;		
Two ploughings and harrowings at and before sowing - -	2 0 0	
Drilling.—Dropping the sets, and covering the Seed - -	2 0 0	
Seed—6 Barrels to the Acre, at 5 *s.* per barrel - - -	1 10 0	
Hoeing with the Plough, and landing - - - - -	1 0 0	
Ploughing out and picking - - - - - - -	1 0 0	
Expense per Acre	- - -	7 10 6
Third Year.		
Oats.—The ground to be laid down with Hay Seed and Clover as in the first mode, in the third year - - - -		
Expense per Acre	- - -	6 16 3
Fourth Year.		
Meadow.—After the Meadow is cut, I should recommend about 250 loads of Gravel per Acre to be spread on the grass, to make up for the Gravel consumed in the first turning - - - - - - - - - -	4 3 4	
Spreading and picking - - - - - - -	0 10 0	
Expense per Acre	- - -	4 13 4
Total Expense of 4 years cultivation and improvement per Acre	- - -	44 13 4
Cr.—Or Return.		
Produce of first Year.		
12 Barrels of Rape-seed at 34 per Barrel per Acre - 20 8 0 Deduct reaping and threshing - - - - 1, 10 0	18 18 0	
Second Year.		
80 Barrels of Potatoes at 5 *s.* per barrel - - - - -	20 0 0	
Third Year.		
14 Barrels of Oats at 14 *s.* per Barrel - - - - -	9 16 0	
Fourth Year.		
Meadow the price at which it would let - - - -	5 0 0	
Total return from 4 years cultivation - - -	- - - -	53 14 0
Deduct Total gain for 4 years cultivation of Bog per Acre -	- - - -	9 0 8
		44 13 4

From the foregoing Prospectus it would appear, that upon the Second rotation of Crops (which I consider to be the best for the ground) there would be a clear profit of £. 9. 0s. 8*d.* per Acre on the general result of 4 years cultivation and improvement, being nearly equal to two Guineas per Acre per Annum.—Fearful, however, lest I should have drawn too flattering a picture of the undertaking, I have gone over every article in the foregoing Estimate, both of Expense and Produce, with some very experienced and discerning farmers, and have not been able, after a thorough investigation, to correct them in any respect.

There would be a clear profit of £ 9 0. 8. per acre on four Years cultivation.

It is, notwithstanding, to be apprehended, that in farming upon a large scale the Expense may be increased beyond the best considered Estimate formed upon a small one. I have therefore deemed it expedient to increase the amount of the outlay by an addition of 10 per cent. to the Estimate, and to subtract 10 per cent. from the produce of the Crops, as an allowance for partial failures arising from inclement seasons.—And I feel satisfied that by so large an allowance (making on the whole concern a deduction of profit amounting to nearly 20 per cent.) I have made ample provision for every possible contingency.

Nearly 20 per cent. is deducted from the above to cover contingencies.

According to the Statement the Account will stand thus:

		£.	s.	d.
To amount of out-lay on second rotation of Crops, as per Prospectus, per Acre	-	44	13	4
Add 10 per cent.	-	4	9	4
Total amount of Out-lay	£.	49	2	8
To amount of return per Acre, as per Prospectus	-	53	14	0
Deduct 10 per cent.	-	5	7	5
Total amount of return	£.	48	6	7
Loss on 4 years cultivation	-	0	16	1
	£.	49	2	8

There would be a loss of £. 2. 12s. 1d. per acre.

From hence it appears on 4 years cultivation there will be a loss of 16*s.* 1*d.* per Acre, to which must be added the expense of Drainage, *viz.* £. 1. 16. 0, making a total loss of £. 2. 12. 1. per Acre, which would be the full purchase paid for bringing unprofitable Red Bog to the value of at least £. 1. 10. per Irish Acre, or £. 0. 18. 6. per English Acre per annum for ever. Let this corrected Estimate then be compared with the important object to be attained, *viz.* 400 Acres of unprofitable Red Bog converted into ground well worth £. 1. 10. per Acre per Annum: and the final account will stand thus, *viz.* 400 Acres at £. 1. 10. per Acre, amounting to £. 600. per Annum, estimated at 18 years purchase, makes £. 10,800 — —

		£.	s.	d.
400 Acres at £. 1. 10. per Acre, amounting to £. 600. per Annum, estimated at 18 years purchase, makes	£.	10,800	—	—
Deduct £. 2. 12. 1. per Acre, on 400 Acres	-	1,041	13	4
Net profit	£.	9,758	6	8

Net profit arising from the sale of 400 acres of reclaimed Bog.

to recompense the Proprietor for his industry and attention in reclaiming 400 Acres of Red Bog. And I beg leave to add, that although the Bog so reclaimed and improved would at some distant periods require to be turned up by the plough, and also to be refreshed with a slight coat of limestone gravel, yet the expense of such process would be amply repaid by the immediate Crops to be produced, and the value of the land, instead of being deteriorated, would be materially improved by such cultivation, if judiciously executed. Under this moderated view of the subject, the profit to the individual Proprietor or Adventurer would still be very great; but if I might be permitted to consider the subject in a national and imperial point of view, and to indulge the hope of a general reclamation and cultivation of one Million of Acres of (now unprofitable) Bog in the heart of Ireland, with the necessarily attendant blessings of civilization, industry, enlarged Production and augmented Revenue arising out of an increased population (creating to itself the means of competent maintenance) I should be at a loss to form a calculation on the happy result.

OBSERVATIONS
on the Applicability of Boggy Soils to White and Green Crops respectively.

Green Crops succeed better than white on Bog.

I beg leave to conclude this discussion with an observation or two, which may perhaps be worthy of consideration.—There is a natural disposition in all Plants towards particular Soils, or in other words, the food of certain Plants is found more abundantly in one kind of Soil than in another.—From the observations I have made on the growth and perfection of different Plants on boggy and moory Soils, I am fully persuaded that such Soils are infinitely better adapted to produce and mature Green than White Crops.—The finest Cabbages, Turnips, Carrots and Parsnips, I have ever seen, have been raised in gardens made in Black Bog, with no other manure than a slight sprinkling of Ashes produced by burning part of the same Soil.—And Potatoes have such an affinity (if I may use the expression) for boggy Soil, that farmers always prefer planting the seed that has been raised on Bog to any other; and frequently send to a considerable distance to obtain it.

The grain of Oats produced on Bog is not so full as upland Corn.

And on the other hand I have found that, although the Crops of Oats, Bere, and Wheat, produced on moory Soils, have been sufficiently luxuriant, yet they have seldom yielded in proportion to their promise, the grain being neither so full nor so bright as that produced upon good upland.

This circumstance, however, may have arisen in a great degree from the want of a sufficient admixture of limestone gravel, or other calcareous matter with the moory Soil.—A corrective always at hand, which, when applied in sufficient quantity, is invariably found to produce the most beneficial effects upon boggy Soils, and *vice versâ*, as Bog-stuff exposed for some months to the atmosphere, well turned, and mixed with common earth and a small portion of caustic lime, is found an excellent Manure for worn-out upland.

A neighbouring Bog is a great advantage to an extensive Farmer.

Were I to point out the most advantageous situation for a judicious and extensive farmer I should place him on the margin of a Bog, upon which he should raise all his green crops; and the whole of the dung produced in the farm-yard by Cattle fed on Turnips, &c. might be applied to the improvement of the uplands—and I am fully persuaded (whenever any extensive plan shall be put into operation for draining the Bogs) that

Sale of Ashes.

that not only the system I have just now suggested will take place, but a very considerable traffic will arise in the manufacture and sale of Ashes *, which will prove equally beneficial to the Bog improver, and to the upland farmer.

Cheap mode of rendering Bog valuable.

The foregoing system, however profitable in the end, would however require considerable capital to carry it into execution upon an extensive scale. And it is almost unnecessary to observe, that the want of capital is the great obstacle to the internal improvement of Ireland;—It may not therefore be improper to suggest a mode of rendering the drained Bog of considerable value by a more simple and less expensive process.

Surface to remain inactive for three or four Years.

If the surface of the drained Bog be suffered to remain inactive for three or four years subsequent to the drainage, a thick crop of common heath will be found growing on its surface intermixed with grass.

Surface burned.

Rape sown.

This heath and the decomposed Boggy Soil which is immediately below it should be ploughed up, gathered into rows and burned. After which operation the surface of the Bog should again be ploughed lightly, the Ashes spread, and Rape-Seed sown; the Rape should not be ſuffered to go to seed, but should be eaten off by Sheep.

Grass-seed sown.

After a few Years heath will again appear.

Bog to be again ploughed, &c.

After light ploughing and harrowing, grass-seeds might then be ſown, which in the course of a year would become excellent food for Sheep and young Cattle, but meadow should not be attempted; after a few years it may be expected that heath will again make its appearance, the process already described may then be resorted to, viz. ploughing, burning, rape-crop, grass, &c. and the second crop of rape will be found to be greatly superior to the first.

Outlay returned in less than a Year.

The expense of rendering the surface of the Bog valuable by the means above described will be trifling and will be amply repaid by the value of the rape-crop ſo that the out lay will be returned in leſs than a year.

PLANTING on BOG.

Planting on Bog.

The antiseptic quality so universally found in Bogs must effectually prevent the growth of all plants that strike deep in ground, or depend for subsistence on a tap-root; we must not therefore expect to find the Oak thrive upon deep Bogs; and indeed it will be advisable, previously to the planting of any trees upon Bog, to destroy the above quality so inimical to vegetation, either by exposure to the atmosphere, or by the admixture of lime, limestone gravel, or other calcareous matter.

I have already stated, that complete Drainage is the first step to every improvement on Bog; when that shall be accomplished, let the Soil be turned up three or four feet deep, and exposed at least twelve months to the influence of the atmosphere; this process, simple and cheap, would, I conceive, be an excellent preparative for planting; and if a small portion of limestone gravel were mixed with the Soil, I might venture to ensure the success of the Plantation.

Scotch Fir.

Scotch Fir at present growing on Portarlington Bog.

The Scotch Fir appears to grow better than any other tree on Red Bog; I have seen instances of its growing even on very wet Bog, with considerable luxuriance. In the Bog of Portarlington, half a mile to the west of the Island of Derryounce, an ancient Fir-tree of considerable magnitude is this moment growing in the middle of one of the wettest Quagmires I have met with.

The Bog in this place is 19 feet deep; with much difficulty and some hazard I contrived to make my way to the tree, and found that the roots had spread in an horizontal direction, to a very great distance around; within the limits of these roots the Bog was perfectly dry; a very small distance beyond them it was so wet as to render the walking on it, without the assistance of planks, nearly impracticable.

Cultivation of Larch.

It would be extremely desirable that Larch should be cultivated on Bog; I have seen it tried on shallow black Bog, where it has grown vigorously; and I entertain no doubt that Larch, and every species of Fir, as well as Birch, Alder, and Ash, would grow vigorously upon Bog, if the process above recommended were adopted.

The best situations for planting on Bog are along the edges of the minor and cross Drains, where the Trees would be very ornamental to the country, and would shelter the crops in the interior.

I have the honour to be,
Gentlemen,
Your most obedient humble Servant,
RICH^{d} GRIFFITH, Jun^{r}. C. E.

Portarlington,
Feb. 9, 1811.

Introduction to the Estimate.

THE prices and general calculation upon which the following Estimate has been formed are exactly similar to those given in my former Report, viz. the prices given by the Grand Canal Company for cutting similar Drains in the same Bogs. It appears, however, that the Expense of draining the Bogs will be less per acre in the western than in the eastern Division of this District. The one, viz. the eastern, amounts to £. 1. 18. $4\frac{1}{2}$. per English Acre, whilst the western amounts to but £. 1. 12. 0. per English Acre. This difference arises partly from the Bogs which compose the western Division being smaller, and consequently requiring in proportion, fewer main Drains, and partly from the whole of the proposed improvements in the Feagile River (which will act as a main Drain for both Divisions) having been charged to the Bogs which compose the eastern Division.

ESTIMATE

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* This traffic is carried on in various parts of England, particularly near Hungerford, in Berkshire.

ESTIMATE.

LITTLE BAR.

ESTIMATE of the Expense of sinking, widening, and shortening the LITTLE BARROW RIVER from
sinking the Bed of the RIVER BARROW, from the Junction

SUBDIVISIONS, Referred to in the MAP and SECTION.			Perches.	Depth of Sinking.	
See "SECTION of the LITTLE BARROW RIVER."				ft.	in.
To making a new Courſe for the River to avoid a great bend		Through Clay and Marl	67.		7:
Ditto	Ditto	Ditto	84.		6.
To sinking in bottom of River		Ditto	55.		1:
Ditto	Ditto	Ditto	70.	2.	6.
Ditto	Ditto	Ditto	42.	1.	6.
Ditto	Ditto	Ditto	18.	1.	
Ditto	Ditto	Ditto	23.	1.	
Sinking in bottom of River Barrow		Clay and Gravel	14.	1.	6.
Ditto	Ditto	Ditto	30.	2.	
Widening the Little Barrow River		Marl and Clay	56.	-	-
Ditto	Ditto	Ditto	182.	-	-
Ditto the River Barrow below the Junction with the Little Barrow		Clay and Gravel	45.	3.	

Incidents at 15 per Cent. - - - - - - - - - - } 20 per Cent. - - -
Superintendence during the execution of the Work at 5 per Cent. - }

TOTAL Amount of the propoſed improvements in the LITTLE BARROW

PHILIPSTOWN

ESTIMATE of the Expense of sinking, widening, and shortening the
Junction with the FEAGILE

See "SECTION of the PHILIPSTOWN RIVER."

Making a new River courſe to avoid a great bend		partly through Bog and partly Gravel.	19.	6.	6.
Ditto	Ditto	Ditto	16.	7.	
Ditto	Ditto	Ditto	24.	8.	
Ditto	Ditto	Ditto	14.	8.	
Ditto	Ditto	Ditto	13.	9.	
Sinking bottom of River		Through Clay and Gravel.	434.	1.	6.
Ditto	Ditto	Ditto	43.	1.	
Ditto	Ditto	Ditto	131.	1.	
Ditto	Ditto	Ditto	286.	3.	
Ditto	Ditto	Ditto	82.	2.	6.
Ditto	Ditto	Ditto	160.	4.	6.
Widening River and easing sharp bends		Chiefly Bog	220.	-	-

Incidents at 15 per Cent. - - - - - - - - - - } 20 per Cent. - -
Superintendence during the execution of the Work at 5 per Cent. - - }

TOTAL Amount of the propoſed improvements in the PHILIPSTOWN

CUSHINA

ESTIMATE of the Expense of sinking

See "SECTION of the CUSHINA RIVER."

To making a new River Courſe	partly through Bog and partly Gravel.	150.	5.
To widening preſent River and cleaning bottom		170.	
Sinking bottom of River	through Gravel and Sand.	165.	2.
Widening and cleaning bottom of River		430.	

Incidents at 15 per Cent. - - - - - } 20 per Cent. - - -
Superintendence during the execution of the Works at 5 per Cent. }

TOTAL Amount of the propoſed Improvements in the CUSHINA

ESTIMATE.

ROW RIVER.

the Junction of the Feagile River to its Junction with the River Barrow; and alſo the Expenſe of of the Little Barrow to the Paſs Bridge above Monaſtereven.

Propoſed Breadth of Drain.				Cubic Yards per Perch.	Rate per Yard.		Rate per Perch.			Amount.			Total Amount.			General Observations.
Top		Bottom.														
ft.	in.	ft.	in.		s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	
50.	0.	20.	0.	190.	—	6	4	15	—	318	5	—				
50.	0.	20.	0.	163.	—	6	4	1	6	342	6	—				The chief part must be divided.
24.	0.	20.	0.	17.	1	—	—	17	—	46	15	—				
26.	0.	20.	0.	45.	1	—	2	5	—	157	10	—				Ditto
24.	0.	20.	0.	26.	1	—	1	6	—	54	12	—				Ditto
24.	0.	20.	0.	17.	1	—	—	17	—	15	6	—				Ditto
24.	0.	20.	0.	17.	1	—	—	17	—	19	11	—				Ditto
34.	0.	30.	0	37.	1	—	1	17	—	25	18	—				Ditto
44.	0.	40.	0.	65.	1	—	3	5	—	97	10	—				
-	-	-	-	-	-	-	—	12	6	35	—	—				
-	-	-	-	-	-	-	—	12	6	113	15	—				
38.		20.		67.	—	4	1	2	6	50	12	6				
													1,277	—	6	by removing small Islands.
-	-	-	-	-	-	-	-	-	-	-	-	-	255	8	1	
and Barrow Rivers, including Incidents,										-	-	£.	1,532	8	7	

RIVER.

Philipstown River, from the Junction of the Esker Stream to its River above Clonbullock.

23.	0.	10.	0.	83.	—	4	1	7	8	26	5	8				
24.	0.	10.	0.	92.	—	4	1	10	8	24	10	8				
26.	0.	10.	0.	112.	—	6	2	16	—	67	4	—				
26.	0.	10.	0.	112.	—	6	2	16	—	39	4	—				
28.	0.	10.	0.	133.	—	6	3	6	6	43	4	6				
13.	0.	10.	0.	13.	1	—	—	13	—	282	2	—				Chiefly to be removed by drudging.
12.	0.	10.	0.	8½.	1	—	—	8	6	18	5	6				
12.	0.	10.	0	8½.	1	—	—	8	6	55	13	6				
16.	0.	10.	0.	30.	—	10	1	5	—	357	10	—				
15.	0.	10.	0.	24.	—	10	1	4	—	98	8	—				
19.	0.	10.	0.	51.	—	10	2	2	6	340	—	—				
-	-	-	-	-	-	-	—	5	—	55	—	—				
													1,407	7	10	
-	-	-	-	-	-	-	-	-	-	-	-	-	281	9	7	
River, including Incidents, &c.										-	-	£.	1,688	17	5	

RIVER.

and widening the Cushina River.

10.	0.	3.	0.	25.	—	3	—	6	3	46	17	6			
							—	2	—	17	—	—			
8.	0.	4	0.	9.	—	6	—	4	6	37	2	6			
							—	2	—	43	—	—			
													144	—	—
-	-	-	-	-	-	-	-	-	-	-	-	-	28	16	—
River, including Incidents, &c.										-	-	£.	172	16	—

BALLYCOMMON

ESTIMATE of the Expense of sinking and widening the Streams, and making the proposed

SUBDIVISIONS Referred to in the MAP and SECTIONS.		Perches.	Depth of Perches.	
			ft.	in.
Bog North of the Summit A B. See "SECTION of BRACKLIN MILL-RACE."				
Sinking Bracklin Mill-race - - - -	Partly through firm Bog, and partly through Gravel - - -	90.	1.	6.
Cleaning and widening D° beyond the Bog - - - - - - -		300	- -	-
To making minor Drains, to be connected with the Mill-race - - - - - - - -	Through very wet Bog	1,762.	8.	0.
Bog South of the Summit A B. See "SECTION of Canal supply Stream."				
Sinking and widening Grand Canal supply Stream:	Through wet Bog -	520.	8.	0.
Making minor Drains, to be connected with the supply Stream - - - - - - -	Through wet Bog -	1,358.	8.	0.
Bog North of the Summit C D. See "Longitudinal SECTION of BALLYCOMMON Bog."				
Making minor Drains, which fall into the Canal	Through wet Bog -	200.	8.	0.
Bog South of the Summit C. D. See "Longitudinal SECTION of BALLYCOMMON Bog."				
Making minor Drains, which will discharge their Water into the Philipstown River - - -	Through wet Bog -	510.	8.	0.
Making intermediate and cross Drains - -	Through wet Bog -	13,054.	5.	0.
Making surface Drains - - - - - - - -	D° - - -	16,784.	3.	0.

Incidents at 15 per Cent. - - - - - - - - - }
Superintendence during the execution of the work, at 5 per cent. } 20 per cent. - - - -

TOTAL Amount of making the several proposed Drains in

DOWN BOG,

ESTIMATE of the Expense of sinking and widening COOLE STREAM, and

Sinking and widening Coole Stream - (See SECTION of COOLE STREAM)		510.	- -	-
Making minor Drains, to be connected with Coole Stream - - - - - - - -	Through soft red Bog -	1,796.	8.	0.
Making cross Drains, to be connected with Coole Stream and the several minor Drains throughout Down Bog - - - - - - - -	- - Ditto - - -	5,836.	5.	0.
Making surface Drains, &c. - - - - -	- - Ditto - - -	7,632.	3.	0.

Incidents, at 15 per Cent. - - - - - - - - }
Superintendence during the execution of the work, at 5 per Cent. } 20 per Cent. - - - -

TOTAL Expense of making the several proposed Drains in

ESKER BOG,

ESTIMATE of the Expense of sinking and widening CUSHANAGOURA STREAM,

Sinking and widening Cushanagoura Stream (See SECTION) - - -		330	- -	-
Making minor Drains, to be connected with the above Stream - - - - - - -	Through wet Bog -	2,194.	8.	0.
Making cross Drains to be connected with Cushanagoura Stream, and the several minor Drains throughout Esker Bog - - - - - -	- - ditto - - -	7,678.	5.	0.
Making surface Drains - - ditto - - -	- - ditto - - -	9,872.	3.	0.

Incidents, at 15 per cent. - - - - - - - - }
Superintendence during the execution of the work, at 5 per Cent. } 20 per Cent. - - - -

TOTAL Expense of making the several proposed Drains in

BOG, or No. 1.

minor, cross, and surface Drains for the discharge of the Waters from BALLYCOMMON BOG, or N° 1.

Proposed Breadth of Drains.		Cubic Yards per Perch.	Rate per Yard.	Rate per Perch.	Amount.	TOTAL Amount.	General Observations.
Top.	Bottom.						
ft. in.	ft. in.		s. d.	£. s. d.	£. s. d.	£. s. d.	
4. 0.	2. 0.	11.	3 —	— 2 9	12 7 6	- - -	This part extends through the Bog.
- - -	- - -	- - -	- - -	— — 8	10 — —	22 7 6	
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	682 15 6	
10. 0.	2. 0.	37.	— 3	— 9 3	- - -	240 10 —	
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	487 9 6	
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	77 10 —	
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	197 12 6	
6. 0.	1. 0.	- - -	- - -	— 2 11	- - -	1,903 14 3	
4. 0.	1. 0.	6.	— 1½	— — 9	- - -	629 8 —	
- -	- -	- -	- -	- - -	- - -	4,241 7 2 848 5 5	
BALLYCOMMON BOG, or No. 1, including Incidents, &c.					£.	5,089 12 7	

or No. 2.

making minor, cross, and surface Drains in DOWN BOG, or No. 2.

- - -	- - -	- - -	- - -	— 2 —	- - -	51 — —
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	695 19 —
6. 0.	1. 0.	14.	— 2½	— 2 11	- - -	851 1 8
4. 0.	1. 0.	6.	— 1½	— — 9	- - -	286 4 —
- -	- -	- -	- -	- - -	- - -	1,884 4 8 376 16 11
DOWN BOG, including Incidents, &c.			- -	- -	£.	2,261 1 7

or No. 3.

and making minor, cross, and surface Drains in ESKER BOG, or No. 3.

- - -	- - -	- - -	- -	— 2 6	- - -	41 5 —
9. 0.	1. 0.	31.	— 3	— 7 9	- - -	850 3 6
6. 0.	1. 0.	14.	— 2½	— 2 11	- - -	1,119 14 2
4. 0.	1. 0.	6.	— 1½	— — 9	- - -	370 4 —
- -	- -	- -	- -	- - -	- - -	2,381 6 8 476 5 4
ESKER BOG, including Incidents, &c.			- -	- -	£.	2,857 11 —

CLONCRANE

ESTIMATE of the Expenſe of making the propoſed main, minor,

SUBDIVISIONS Referred to in the MAP and SECTIONS.		Perches.	Depth of Sinking ft.	in
Bog North of the Summit, G H. See "SECTION of MOSS ROAD."				
Making a main Drain along the eaſt edge of Cloncrane Bog, which falls into the Feagile River at Kilcumber - - - - - - -	Through firm Bog - -	320.	6.	
Making minor Drains, ſome of which will diſcharge their Water into the above main Drain, and ſome into the Feagile River below Kilſcumber - -	Through ſoft Bog -	1,884.	8.	
Bog Weſt of the Summit, G H.				
Making the main Drain, r s. - - - - -	Through Quagmire	324.	10.	
- - Ditto - - Ditto - - - - - -	firm Bog -	216.	3.	
- Ditto - - Ditto - - - - - -	Ditto - -	216.	- - -	
Making minor Drains to be connected with the main Drain - - - - - - -	- - ſoft Bog - -	718.	8.	
Making the main Drain, t v. - - - -	Partly through Quagmire, and partly through ſoft Bog - - -	450.	10.	
Making minor Drains to connect with the main Drain, t v - - - - - - -	- - Ditto - -	792.	8.	
Making croſs Drains to be connected with the above main and minor Drains - - -	- - Ditto - -	11,880.	5.	
Making ſurface Drains - Ditto - - -	- Ditto - -	15,274.	3.	

Incidents, at 15 per cent. - - - - - - - }
Superintendence during the execution of the work, at 5 per cent } 20 per cent. - - - -

TOTAL Expenſe of making the ſeveral propoſed Drains in

MOUNT LUCAS

ESTIMATE of the Expenſe of ſinking and widening the Streams, and making

Bog West of the Summit, L M. See "SECTION of MOSS ROAD."				
Making the propoſed minor Drains - - -	Through soft Bog -	320.	8.	0.
Bog between the Summits, L M, N O, and P Q.				
Opening the Stream, v w, which is at preſent chiefly subterraneous - - - - -	- - firm Bog -	110.	8.	0.
Sinking and widening part beyond the Bog - -	- Ditto - -	240.	- - -	
Opening the Stream, x y, which is at preſent chiefly subterraneons - - - - -	- - Ditto - -	150.	8.	0.
Ditto - - - Ditto - - - -	- Ditto - -	180.	7.	0.
Sinking and widening Ditto beyond the Bog - -	- Ditto - -	220.	4.	0.
Making minor Drains to be connected with the above Streams - - - - - -	- - wet Bog -	1,682.	8.	0.
Cleaning Stream which falls into the Stream v w -	- - - -	260.	- - -	
Bog North of the Summit, P. Q.				
Making minor Drains to be connected with the Philipstown River - - - - - -	Through very wet Bog -	570.	8.	0.

BOG, or No. 4.

cross, and surface Drains in CLONCRANE BOG, or No. 4.

Proposed Breadth of Drains. Top.	Proposed Breadth of Drains. Bottom.	Cubic Yards per Perch.	Rate per Yard.	Rate per Perch	Amount.	TOTAL Amount.	General Observations.
ft. in.	ft. in.		s. d.	£. s. d.	£. s. d.	£. s. d.	
8. 0.	2. 0.	23.	— 3	— 5 9	92 — —		
9. 0.	1. 0	31.	— 3	— 7 9	730 1 —		
12. 0.	2. 0.	54½.	— 4½	1 — 5	330 15 —		The Drain is already partly made in this place. widening the part already made.
5. 0.	2. 0.	8.	— 3	— 2 —	21 12 —		
- - -	- - -	- - -	- - -	— — 8	7 4 —		
9. 0.	1. 0.	31.	— 3	— 7 9	278 4 6		
12. 0.	2. 0.	54½.	— 4½	1 — 5	459 7 6		
9. 0.	1. 0.	31.	— 3	— 7 9	306 18 —	1,404 1 —	
6. 0.	1. 0.	14.	— 2½	— 2 11		1,732 10 —	
4. 0.	1. 0.	6.	— 1½	— — 9		572 15 6	
						4,531 7 6	
- - -	- - -	- - -	- - -	- - -	- - -	906 5 6	
CLONCRANE BOG, including Incidents, &c.					- - - £.	5,437 13 —	

BOG, or No. 5.

the proposed main, minor, cross, and surface Drains in MOUNT LUCAS BOG, or No. 5.

9. 0.	1. 0.	31.	— 3	— 7 9	- -	201 10 —	
9. 0.	1. 6.	32½	— 3	— 8 1½	44 13 8		
- - -	- - -	- - -	- - -	— — 8	8 — —		
9. 0.	1. 6.	32½	— 3	— 8 1½	60 18 8		
8. 0.	1. 6.	26.	— 3	— 6 6	58 10 —		
5. 0.	1. 6.	10.	— 2	— 1 8	18 6 8		
9. 0.	1. 0.	31.	— 3	— 7 9	651 15 6		
- - -	- - -	- - -	- - -	— — 8	8 13 4	850 17 10	
9. 9.	1. 0.	31.	— 3	— 7 9	- - -	220 17 6	
Amount carried forward					- - £.	1,273 5 4	

SUBDIVISIONS Referred to in the MAP and SECTIONS.		Perches.	Depth of Sinking	
			ft.	in
Amount brought forward		- - -	- -	-
Bog North and South of the Summit R S, and between the Summit N O, and the road from Portarlington to Mount Lucas.				
Making the main Drain, y z. - - - -	Through very wet Bog -	444.	10.	0.
Sinking the Stream which rises near Derrylask Island - - - - - - - - -	- - firm Bog - -	252.	- -	-
Making minor Drains connected with the above - - - - - -		3,386	8.	0.
Bog East of the road from Portarlington to Mount Lucas.				
See " SECTION of the PIKE-STREAM."				
Sinking and widening the Pike-Stream - - - - - - - -		400.	- -	-
Making minor Drains which commence at the above Road, and end at the Philipstown River. (See Map.) - - - - - - - - -	Through tolerably firm Bog - - -	1,240	8.	0.
Making cross Drains to be connected with the several Streams and main and minor Drains, throughout Mount Lucas Bog, or No. 5. - -	Through red Bog, black Bog, and Quagmire -	27,292.	5.	0.
Making surface Drains - - Ditto - Ditto - - -	Ditto - -	35,090.	3.	0.

Incidents, at 15 per cent. - - - - - - - -
Superintendence during the execution of the work, at 5 per cent. } 20 per cent. - - - -

TOTAL Expense of making the several proposed Drains in MOUNT LUCAS

CLONSAST BOG,

ESTIMATE of the Expense of sinking CAFFREY'S GLASH, and the several main, minor,

Bog North of the Summit, V W.				
Making the main Drain A B. - - - -	Through wet Bog - -	470.	10.	0.
- - Ditto - - - Ditto - - -	· compact Bog - -	144.	6.	0.
Building a Bridge where the main Drain, a b crosses the Road from the Welsh Islands, to Clonbullock - - - - - - -	- - - - -	- - -	- -	-
Making minor Drains to be connected with the above main Drain - - - - -	- - - - -	1,660.	8.	0.
Bog between the Summits, v w and y z, and West of the Summit between Clonshannon and Clonevoe.				
Sinking Caffrey's Glash - - - - -	Through clay and gravel	136.	1.	6.
- - Ditto - - - - - - - - -	- firm Bog -	190.	2.	0.
- - Ditto - - - - - - - - -	- Ditto - -	210.	4.	0.
Widening Caffry's Glash at top - - - - - - - -	-	536.	- -	-
Making main Drain from the edge of the Bog at Bonagappa, to the source of Caffry's Glash -	Through Quagmire -	252.	8.	
Making minor Drains to be connected with Caffry's Glash - - - - - - - - -	Through wet Bog - -	2,152.	8.	0.

Proposed Breadth of Drains. Top.	Bottom.	Cubic Yards per Perch.	Rate per Yard.	Rate per Perch.	Amount.	Total Amount.	General Observations.
ft. in.	ft. in.		s. d.	£. s. d.	£. s. d.	£. s. d.	
- - -	- - -	- - -	- - -	- - -	- - -	1,273 5 4	
12. 0.	2. 0.	54½.	— 4½	1 — 5	453 5 —		
- - -	- - -	- - -	- - -	— 2 —	25 4 —		
9. 0.	1. 0.	31.	— 3	— 7 9	1,312 1 6	1,790 10 6	
- - -	- - -	- - -	- - -	— 1 —	20 — —		This Stream has been already much improved.
9. 0.	1. 0.	31.	— 3	— 7 9	480 — 10	500 10 —	
6. 0.	1. 0.	14.	— 2½	— 2 11	- - -	2,380 1 8	
4. 0.	1. 0.	6.	— 1½	— — 9	- - -	1,315 17 6	
						7,260 5 —	
- - -	- - -	- - -	- - -	- - -	- - -	1,452 1 —	
Bog, including Incidents, &c.			- -	- -	£.	8,712 6 —	

or No. 6.

cross and surface Drains throughout CLONSAST BOG, or No. 6.

11. 0.	1. 6.	48.	— 4	— 16 —	276 — —	
7. 0.	2. 0.	21.	— 2½	— 4 4	31 4 —	
- - -	- - -	- - -	- - -	- - -	20 — —	
9. 0.	1. 0	31.	— 3	— 7 9	623 5 —	950 9 —
4. 0.	2. 0.	3.	— 4	— 1 —	6 16 —	
6. 0.	2. 0.	6.	— 3	— 1 6	14 5 —	
6 0.	2. 0.	12½	— 3	— 3 1½	32 16 3	
- - -	- - -	- - -	- - -	— 1 —	26 16 —	
10. 0.	2. 0.	37.	— 3½	— 10 9½	135 19 6	
9. 0.	1. 0.	31.	— 3	— 7 9	833 18 —	1,050 10 9
96.		Amount carried forward		-	- £.	2,000 19 9

SUBDIVISIONS, referred to in the MAP and SECTIONS.	Perches.	Depth of Sinking.	
		ft.	in.
Amount brought forward	- - -	- -	-
Bog East of the Summit, between CLONSHANNON and CLONEVOE.			
Making the main Drain *cfg*. (See SECTION *efg*)	110.	- -	-
Ditto - - - Ditto - Through Clay and Gravel	115.	4.	0.
Building a Bridge where the proposed main Drain crossed the road from Millgrove to Clonbullock	- - -	- -	-
Continuation of the main Drain *efg* - Through wet Bog	245.	8	0.
Ditto - - - Ditto - Ditto	335.	10.	0
Ditto - - - Ditto - firm Bog	44.	3.	0.
Making minor Drains, to be connected with the above main Drain - Through wet Bog	1,244.	8.	0.
Bog South of the Summit, Y Z.			
See cross SECTION of the District from the RIVER BARROW to the PHILIPSTOWN RIVER.	-	-	
Making minor Drains, which will discharge their water into the Cushina River - Through wet Bog	3,974.	8.	0.
Bog East of the Road from Cushina to Ardiagh.			
Making minor Drains - Through wet Bog	580.	8.	0.
Cleaning a Drain already made from the edge of the Bog at Chevy Chase to the Cushina River, near its junction with the little Barrow River - Through Marl and Clay	160.	- -	-
Making cross Drains, to be connected with Caffry's Glash, and the several main and minor Drains throughout Clonsast Bog, or No 6.	28,830.	5.	0.
Making surface Drains - - Ditto	38,440	3.	0.

Incidents at 15 per Cent. }
Superintendence during the execution of the Work, at 5 per Cent. } 20 per Cent. - - -

TOTAL Expense of making the several proposed

BALLYKEANE BOG,

ESTIMATE of the Expense of sinking and widening BALLYKEANE STREAM, and making

Sinking and widening Ballykeane Stream - Through firm Bog and Quagmire	610.	6.	0.
Making minor Drains, to be connected with the above Stream - Through wet Bog	1,746.	8.	0.
Making cross Drains, to be connected with the Stream and the several minor Drains - Ditto	6,110.	5.	0.
Making surface Drains - - Ditto - Ditto	7,856.	3.	0.

Incidents, at 15 per Cent. }
Superintendence during the execution of the work, at 5 per Cent. } 20 per Cent. - - - -

TOTAL Expense of making the several proposed

MOANVAGHAN

ESTIMATE of the Expense of making the proposed minor

Making minor Drains to discharge their water into Bogtown Mill stream,	1,676.	8.	0.
Making cross Drains to be connected with the minor drains - Through soft Bog,	5,866.	5.	0.
Making surface Drains Ditto - Ditto	7,542.	3.	0.

Incidents, at 15 per Cent. }
Superintendence during the execution of the work, 5 per Cent. } 20 per Cent. - -

TOTAL Expense of making the several propofed Drains in MOANVAGHAN

Proposed Breadth of Drains. Top.		Proposed Breadth of Drains. Bottom		Cubic Yards per Perch.	Rate per Yard.	Rate per Perch.	Amount.	TOTAL Amount.	General Observations.
ft.	in.	ft.	in.		s. d.	£. s. d.	£. s. d.	£. s. d.	
- - -		- - -		- - -	- - -	- - -	- - -	2,000 19 9	
- - -		- - -		- - -	- - -	— 1 —	5 10 —		Cleaning Drain near the Feagile river, already made.
7.	0.	2.	0.	14.	— 4	— 4 8	26 16 8		
- - -		- - -		- - -	- - -	- - -	15 — —		
9.	6.	1.	6.	34.	— 3	— 8 6	104 2 6		
11.	6.	1.	6.	51.	— 3½	— 14 10	174 15 7		
4.	6.	1.	6.	7.	— 2	— 1 2	2 11 4		
9.	0.	1.	0.	31.	— 3	— 7 9	482 1 0	810 17 1	
9.	0.	1.	0.	31.	— 3	— 7 9	- - -	1,539 18 6	
9.	0.	1.	0.	31.	— 3	— 7 9	224 15 —		
- - -		- - -		- - -	- - -	— 1 —	8 — —	232 15 —	
6.	0.	1.	0.	14.	— 2½	— 2 11	- - -	4,554 13 4	
4.	0.	1.	0.	6.	— 1½	— — 9	- - -	1,440 — —	
								10,579 3 8	
- - -		- - -		- - -	- - -	- - -	- - -	2,115 16 9	
Drains in CLONSAST BOG, or No. 6.							£.	12,695 — 5	

---

or No. 7.

the several minor, cross, and surface Drains throughout BALLYKEANE BOG, or No. 7.

8.	0	2.	0.	23.	— 3	— 5 9	181 2 6	
9.	0.	1.	0.	31.	— 3	— 7 9	677 11 6	858 14 —
6.	0.	1.	0.	14.	— 2½	— 2 11	891 — 10	
4.	0.	1.	0.	6.	— 1½	— — 9	296 2 —	1,187 2 10
								2,045 16 10
- - -		- - -		- - -	- - -	- - -	- - -	409 3 4
Drains in BALLYKEANE BOG, or No. 7.							£.	2,455 — 2

BOG, or No. 8.

cross, and surface Drains in MOANVAGHAN BOG, or N° 8.

9.	0.	1.	0.	31.	— 3	— 7 9	649 12 8	
6.	0.	1.	0.	14.	— 2½	— 2 11	855 9 2	
4.	0.	1.	0.	6.	— 1½	— — 9	282 16 6	1,787 18 4
- - -		- - -		- - -	- - -	- - -	- - -	357 11 8
BOG, or No. 8, including Incidents, &c.							£.	2,145 10 —

PORTARLINGTON

ESTIMATE of the Expense of sinking and widening BOGTOWN MILL-STREAM, and making the

SUBDIVISIONS, Referred to in the MAP and SECTIONS.		Perches	Depth of Sinking. ft.	in.
Sinking and widening Bogtown Millstream -	Through Clay and Gravel.	220.	2.	0.
Widening Ditto - - - - - - -	Firm Bog - - -	320.	- -	-
Bog North of the Summit.				
Making minor Drains to discharge into Bogtown stream, and into the Cushina River - -	Through Quagmire and wet Bog. - -	3,626.	8.	0.
Bog South of the Summit, and West of road from Portarlington to Cushina.				
Cleaning Drains which run from the southern edge of the Bog, and fall into the River Barrow between the Bridges of Portarlington - - -		280.		
Making minor Drains which connect with the above drains, - - - - - - - -	Through wet Bog. -	1,614.	8.	0.
Bog South of the Summit, and East of the above Road.				
Making the main Drain, *n o* - - - - - - - - - -		710.	10.	0.
Cleaning Drain already made from Derry Lea, to the River Barrow - -		112.	- -	-
Making minor Drains to discharge into the main Drain - - - - -		776.	8.	0.
Making cross Drains to be connected with the main Drain, *n o*, and the several minor Drains, -	Through wet Bog.	19,552.	5.	0.
Making surface Drains, Ditto - - -	Ditto - - - - -	25,568.	3.	0.
Incidents, at 15 per Cent - - - - - - - - - Superintendence during the execution of the work, at 5 per Cent -	20 per Cent.		-	-

TOTAL Expense of making the several proposed Drains in PORTARLINGTON

UMMERUS

ESTIMATE of the Expense of making the several proposed main,

Bog North of the Summit.				
Making the main Drain *p q*. (See SECTION of MAIN DRAIN) - - - - - -	Through very soft Bog -	500.	11.	0.
- - - D° - - - - D° - - - -	Through Marl and Clay	120.	5.	0.
Making minor Drains to be connected with the above - - - - - - - -	Through very soft Bog	1,118.	8.	0.
Bog South of Summit.				
Making minor Drains to be connected with a Drain which falls into the Little Barrow River South of Cleghan - - - - - - - -	- - - D° - - - - -	272.	8.	0.
Cleaning the above-mentioned Drain - - - - - - - -		350.	-	-
Making cross Drains to be connected with the above main and minor Drains -		4,512.	5.	0.
- D° - surface Drains - - - D° - - - D° - - - - -		5,908.	3.	0.
Incidents at 15 per Cent. - - - - - - - - - - - - - Superintendence during the execution of the work, at 5 per Cent.	20 per cent. -	--	-	-

TOTAL Expense of making the several proposed Drains in UMMERUS

BOG, or N° 9.

several propoſed main, minor, cross, and surface Drains in PORTARLINGTON BOG, or N° 9.

Proposed Breadth of Drains.		Cubic Yards per Perch.	Rate per Yard.	Rate per Perch.	Amount.	TOTAL Amount.	General Observations.
Top.	Bottom.						
ft. in.	ft. in.		s. d.	£. s. d.	£ s. d	£. s. d.	
6. 0.	4. 0.	6. 0.	— 4	— 2 —	22 — —		
- - -	- - -	- - -	- - -	— 1 —	16 — —		
						38 — —	
9. 0.	1. 0.	31. 0.	— 3	— 7 9	- - -	1,405 1 6	
				— — 8	9 6 8		
9. 0.	1. 0.	31. 0.	— 3	— 7 9	625 8 6		
						634 15 2	
11. 0.	1. 6.	48. 0.	— 4	— 16 —	568 — —		
- - -	- - -	- - -	- - -	— 1 —	5 12 —		
9. 0.	1. 0.	31. 0.	— 3	— 7 9	300 14 —		
						874 6 —	
6. 0.	1. 0.	14. 0.	— 2½	— 2 11	- - -	2,851 6 8	
4. 0.	1. 0.	6. 0.	— 1½	— — 9	- - -	959 — —	
						6,762 9 4	
- -	- -	- -	- -	- -	- - -	1,352 9 10	
Bog, including incidents, &c. - -					- - £.	8,114 19 2	

BOG, or No. 10.

minor, cross and surface Drains in UMMERUS BOG, or No. 10.

13. 0.	2. 0.	64.	1 6 8	1 6 8	666 13 4	
9. 6.	2. 0.	22.	3 —	— 5 6	33 — —	
9. 0.	1. 0.	31.	— 3	— 7 9	433 4 6	
						1,132 17 10
9. 0.	1. 0.	31.	— 3	— 7 9	105 8 —	
- -	- -	- -	- -	— — 10	14 11 8	
						119 19 8
6. 0.	1. 0.	14.	— 2½	— 2 11	- - -	658 17 6
4. 0.	1. 0.	6.	— 1½	— — 9	- - -	221 11 —
						2,133 6 —
- -	- -	- -	- -	- -	- - -	426 13 2
Bog, including Incidents, &c. -					- - £.	2,559 19 2

96.

GEASHIL

ESTIMATE of the Expense of making the several proposed

SUBDIVISIONS Referred to in the Map and Sections.		Perches.	Depth of Sinking.	
			ft.	in.
Making minor Drains in Geashil Bog to the several falls, as described in the Report - - -	Through very wet Bog -	1,108.	8.	0.
Making cross Drains to be connected with the minor Drains - - - - - -	- - - Ditto - -	2,300.	5.	0.
Ditto - surface Drains - - - Ditto - - - - - -	Ditto - -	3,400.	3.	0.

Incidents at 15 per cent. - - - - - - - - }
Superintendence during the execution of the work, at 5 per cent. } 20 per cent. - - -

TOTAL Expense of making the several proposed Drains in GEASHIL

GARRYHINCH

ESTIMATE of the Expense of improving the Courses of the Streams, and making

Sinking and widening the Cottoners Brook (See SECTION) - - - - - - - -	Through firm Bog -	115.	1.	0.
- - - Ditto - - - - - Ditto - - - - - - - -	firm Bog -	350.	3.	6
- - - Ditto - - - - - Ditto - - - - - -	Clay and Gravel	45.	2.	0.
- - - Ditto - - - - - Ditto - - - - - - - -	firm Bog -	38.	2.	6.
- - - Ditto - - - - - Ditto - - - - - - - -	Ditto -	49.	4.	0.
Paring and cleaning the side of Ditto - - - - - - - - -	Ditto -	824.	-	-
Making the main Drains, *r. f.* - - - - -	Through wet Bog -	250.	10.	0.
Making minor Drains to be connected with the main Drain, *r. f.* - - - - - - - -	- - Ditto - -	2,846.	8.	0.
Garryhiuch Mill-race.				
(See SECTION of GARRYHINCH MILL-RACE.)				
Making new Drains from the Bog edge near Fernamona to the source of the Mill-race - - - - -	Through Quagmire	190.	8.	0.
- - - - Ditto - - - - - Ditto - - - - - - - - - -	Ditto -	160.	8.	0.
Sinking bottom of Millrace - - - - - - - - -	Firm Bog - -	210.	5.	0.
- - Ditto - - Ditto - - - - - - - - - - - - -	Ditto -	181.	4.	0.
- - Ditto - - Ditto - - - - - - - - - -	Clay and Gravel -	20.	2	0.
Paring and Cleansing sides of Mill-race - - - - - -	Firm Bog - -	411.	-	-
Making minor Drains, to be connected with the Mill-race - - - - - - - - - -	Very wet Bog -	2,196.	8.	0.
Making minor Drains which fall into the River Barrow -	Wet Bog - -	588.	8.	0.
Cleaning Drains which have been made from the Bog to the River - - - - - - - -	Clay and Gravel -	144.	-	-
Making cross Drains to be connected with the above Streams and main and minor Drains - - - -	Wet Bog - -	19,704	5.	0.
Ditto - surface Drains - - Ditto - - Ditto - - - -	Ditto -	25,334	3.	0.

Incidents at 15 per cent. - - - - - - - - }
Superintendence during the execution of the work, at 5 per cent. } 20 per cent. - - -

TOTAL Expense of making the several proposed Drains, &c. in GARRYHINCH

BOG, or No. 11.

minor, cross, and surface Drains in GEASHIL BOG.

Propoſed Breadth of Drains.				Cubic Yards per Perch.	Rate per Yard.		Rate per Perch.			Amount.			TOTAL Amount.			General Observations.
Top.		Bottom.														
ft.	in.	ft.	in.		s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.	
9.	0.	1.	0.	31.	—	3	—	7	9	-	-	-	429	7	—	
6.	0.	1.	0.	14.	—	2½	—	2	11	-	-	-	335	8	6	
4.	0.	1.	0.	6.	—	1½	—	—	9	-	-	-	127	10	—	
													892	5	6	
-	-	-	-	-	-	-	-	-	-	-	-	-	178	9	1	
Bog, including Incidents, &c.				-	-	-	-	-	£				1,070	14	7	

BOG, or No. 12.

the proposed main, minor, cross, and surface Drains throughout GARRYHINCH BOG.

Top ft.	Top in.	Bottom ft.	Bottom in.	Cubic Yards per Perch.	Rate per Yard s.	d.	Rate per Perch £.	s.	d.	Amount £.	s.	d.	Total Amount £.	s.	d.	General Observations.
5.	0.	3.	0.	3.	—	4	—	1	—	5	15	—				
5.	6	2.	0.	10.	—	4	—	3	4	58	6	8				
8.	0.	2.	0.	8.	—	4	—	2	8	6	—	—				
5.	0.	2.	0.	7.	—	3	—	1	9	3	6	6				
6.	0.	2.	0	12½.	—	2	—	2	1	5	2	1				
-	-	-	-	-	-	-	—	—	8	27	9	4				
11.	0.	1.	6.	48.	—	4	—	16	—	200	—	—				
9.	0.	1.	0.	31.	—	3	—	7	9	1,102	16	6				
													1,302	16	6	
10.	0.	2.	0.	37.	—	3	—	9	3	87	17	6				
10.	0	2.	0.	37.	—	3	—	9	3	74	—	—				
7.	0.	2.	0.	17½.	—	3½	—	5	1½	53	16	3				
6.	0.	2.	0.	12½.	—	3½	—	3	7½	32	16	1				
4.	0.	2.	0.	5.	—	4	—	1	8	1	13	4				
-	-	-	-	-	-	-	—	1	—	20	11	—				
9.	0.	1.	0.	31.	—	3	—	7	9	851	19	—				
													1,122	13	2	
9.	0.	1.	0	31.	—	3	—	7	9	227	17	—				
-	-	-	-	-	-	-	—	1	—	7	4	—				
													235	1	—	
6.	0.	1.	0.	14.	—	2½	—	2	11	-	-	-	2,873	10	—	
4.	0.	1.	0.	6.	—	1½	—	—	9	-	-	-	950	—	—	
													6,590	—	3	
-	-	-	-	-	-	-	-	-	-	-	-	-	1,318	—	—	
Bog, including Incidents, &c.				-	-	-	-	-	-	-	-	£.	7,908	—	3	

DERRYGYLE

ESTIMATE of making the several proposed minor,

SUBDIVISIONS Referred to in the MAP and SECTIONS		Perches.	Depth of Sinking.	
Bog North of the Summit.			ft.	in.
Making a minor Drain connected with a Stream already made, which falls into the River Ownass at Derry Cloneybridge - - - - -	Through wet Bog -	390.	8.	0.
Cleaning Drain already made - - - - - - - - - -		90.	-	- -
Bog South of Summit.				
Making minor Drains which fall partly to the Stream at Clonsoughy, and partly into the Trihogue Stream - - - - - -	Through wet Bog -	1,376.	8.	0.
Cleaning Drains already made - - - - - - - - - -		188.	-	- -
Making cross Drains to be connected with the several minor Drains - - - - -	- - Ditto - -	6,180.	5.	0.
Making surface Ditto - Ditto - - - - -	Ditto - -	7,946.	3.	0.

Incidents, at 15 per cent. - - - - - - - - } 20 per cent. - - - - -
Superintendence during the execution of the work, at 5 per cent. }

TOTAL Expense of making the several proposed Drains in DERRYGYLE

BOG, or No. 13.

croſs, and ſurface Drains in DERRYGYLE BOG.

Propoſed Breadth of Drains.		Cubic Yards per Perch.	Rate per Yard.	Rate per Perch.	Amount.	TOTAL Amount.	General Obſervations.
Top.	Bottom.						
ft. in.	ft. in.		*s.* *d.*	*£.* *s.* *d.*	*£.* *s.* *d.*	*£.* *s.* *d.*	
9. 0.	1. 0.	31.	— 3	— 7 9	151 2 6		
- - -	- - -	- - -	- - -	— 1 —	4 10 —	155 12 6	
9. 0.	1. 0.	31.	— 3	— 7 9	533 4 —		
- - -	- - -	- - -	- - -	— 1 —	9 8 —	542 12 —	
6. 0.	1. 0.	14.	— 2½	— 2 11		901 5 —	
4. 0.	1. 0	6.	— 1½	— — 9		297 19 6	
						1,897 9 —	
- -	- -	- -	- -	- -	- -	379 9 9	
Bog, including Incidents, &c. -	-	-	-	-	*£.*	2,276 18 9	

General Abstract

GENERAL ABSTRACT

		Main and minor Drains, including Rivers. £.	s.	d.
Estimate of the Expence of improving the Rivers connected with the several Bogs contained in the Western Division of District No. 1.		3,394	2	—
Amount of Estimate of BALLYCOMMON BOG, or	No. 1.	1,708	5	—
- - - - - DOWN BOG, or	No. 2.	746	19	—
- - - - - ESKER BOG, or	No. 3.	891	8	6
- - - - - CLONCRANE BOG, or	No. 4.	2,226	2	—
- - - - - MOUNT LUCAS BOG, or	No. 5.	3,563	1	10
- - - - - CLONSAST BOG, or	No. 6.	4,584	10	4
- - - - - BALLYKEANE BOG, or	No. 7.	858	14	—
- - - - - MOANVAGHAN BOG, or	No. 8.	649	12	8
- - - - - PORTARLINGTON BOG, or	No. 9.	2,952	1	8
- - - - - UMMERUS BOG, or	No. 10.	1,252	17	6
- - - - - GEASHIL BOG, or	No. 11.	429	7	—
- - - - - GARRYHINCH BOG, or	No. 12.	2,666	10	3
- - - - - DERRYGYLE BOG, or	No. 13.	698	4	6
TOTALS - - - - £.		26,621	16	3

APPENDIX TO MR. GRIFFITH'S REPORT.

GENERAL DESCRIPTION OF THE RIVER BARROW.

APPENDIX to Mr. Griffith's Report.

THE River Barrow takes its rise in Glenbarrow, in the Slieve Bloom Mountains, between the ridges of Knockstumba and Capard. The composition of the Slieve Bloom Mountains is alternate beds of greyish-white and easily decomposed Sandstone and reddish-brown Slate Clay. The water of the River Barrow brings down from the Mountains, in times of flood, (as might be expected from such a source) vast quantities of siliceous sand, which it deposits on the low land on either side of the river, and frequently in the autumnal floods to the destruction of the meadows, by covering them so profusely with sand as to render them totally unfit for fodder.

The fall of the River Barrow from its source to the Two Mile Bridge, near Mountmelick, is extremely rapid, and its bed is entirely composed either of Sandstone Rock in situ, or of loose fragments of similar Rock, which from time to time have been detached from the Mountain and carried down by the torrent. Below the Two Mile Bridge the River runs in a very narrow valley the boundaries of which are composed of high and nearly perpendicular ridges or banks of limestone gravel, which on the north side intercept the waters of the Bog of Garryhinch from immediately falling into the River, this ridge is called Forest, having been, I suppose, formerly covered with wood, no trace of which, however, is now visible, excepting a few scattered buſhes of White Thorn and Hazel. The ridge of Forest continues without any material interruption to Borness, where it ends, and where for the first time the waters from the Bog of Garryhinch may be discharged into the River Barrow by the stream called Cottoners Brook, which forms the boundary of the King's and Queen's Counties.

The

OF ESTIMATE.

Intermediate and cross Drains.			Surface Drains.			TOTAL, including Incidents and Superintendence			Irish Acres	English Acres.
£.	s.	d.	£.	s.	d.	£.	s.	d.		
-	-	-	-	-	-	3,394	2	—	- - -	- - -
1,903	14	2	629	8	-	5,089	12	7	1,750	2,834
851	1	8	286	4	—	2,261	1	7	945	1,547
1,119	14	2	370	4	—	2,857	11	—	985	1,595
1,732	10	—	572	15	6	5,437	13	—	1,275	3,523
2,380	1	8	1,315	17	6	8,712	6	—	4,063	6,582
4,554	13	4	1,400	—	—	12,695	—	5	5,055	8,188
891	—	10	296	2	—	2,455	—	2	1,125	1,822
855	9	2	282	16	6	2,145	10	—	850	1,377
2,851	6	8	959	—	—	8,114	19	2	3,035	4,916
658	17	6	221	15	—	2,559	19	2	785	1,272
335	8	6	127	10	—	1,870	14	7	470	761
2,873	10	—	950	—	—	7,908	—	3	3,270	5,297
901	5	—	297	19	6	2,276	18	9	840	1,361
22,098	4	2	7,798	13	—	66,978	8	8	25,358	41,075

The ridge on the south side of the River extends from Two Mile Bridge to Graigue, below which it expands westward, and forms the vale of the River Ounass, which River is similarly circumstanced with the River Barrow, having its source in the Slieve Bloom Mountains on the south side of the ridge of Capard, from whence it has a very rapid fall to its junction with the Barrow.

APPENDIX
to
Mr Griffith's Report,
No. 4.

The fall of the River Barrow from the Two Mile Bridge to its junction with the Ounass, is 12 feet 6 inches, and the distance is 3 miles. After the junction of the Ounass, the River Barrow assumes a more formidable appearance, the rapidity of its course is however frequently checked by undulations in its bottom, the summer depth of the River, in some parts, being less than one foot, whilst in others it is seven and eight. These interruptions in the current cause the flat called the Pollough to be constantly flooded in winter, and frequently in autumn. This flat extends on the south side of the River, between the junction of the River Ounass and the Tryhogue stream with the River Barrow.

The Tryhogue stream has its source in a small Bog, two miles to the south of the Town of Maryborough, from whence it takes a meandering course by Meelick Mill, and afterwards having passed through the Town of Maryborough it skirts along the western edges of some steep gravel ridges, on the summit of which the high Road between Maryborough and Mount Melick has been carried. At Kile the Tryhogue stream is joined by a smaller stream, which is partly supplied by the waters from the Bog of Derry Gyle, below which the united streams run in a narrow valley, bounded on both sides by irregular gravel hills; this valley on approaching the River Barrow expands, and forms part of the Pollough Meadows already mentioned.

The fall of the Tryhogue stream from the junction of the stream at Kile, to its junction with the River Barrow, is 30 feet 6 inches.

APPENDIX
to
Mr. Griffith's Report,
No. 4.

By deepening the River Barrow, as pointed out in the Section, between the junction of the River Ownass and Portnahinch Bridge, the floods above alluded to might be prevented, and the Pollough meadows would thereby become extremely valuable. The fall of the River from the junction of the River Ownass to Portnahinch Bridge is six feet, and the distance is $1\frac{3}{4}$ mile between the Bridges of Portnahinch and Kilenahown; the depth of the River varies from one to three feet; its course winds exceedingly; its banks are however so much elevated above the water that the winter and autumn floods seldom affect the adjoining lands, excepting that part near the house of Garryhinch, where there is a very considerable shallow, and where the fall in the River is less rapid than in any other part. By lowering the bed of the River at the several sharps from the junction of Garryhinch Mill-race, to the tail of the island below Kilenahown Bridge, these floods may be considerably lessened, if not totally done away. The fall from Portnahinch Bridge to Kilenahown Bridge, is five feet, and the distance is two miles. The vale of the River between Kilenahown Bridge and Portarlington Bridge is narrow, and though the meadows on either side are usually flooded in winter, I am of opinion that their probable increase in value, from their small extent, could not warrant the expense of lowering the River. The fall from Kilenahown Bridge to Portarlington Bridge is 7 feet, and the distance is $1\frac{3}{4}$ mile.

The River between the two Bridges of Portarlington is extremely shallow; when I sounded it (in the beginning of July last) its depth for the most part did not exceed ten inches, and frequently not more than three; this shallow is of great detriment to that part of the Town of Portarlington, situated nearest the River, and might be removed at a very moderate Expense, the bottom being formed of loose limestone gravel.

The lower Bridge, called the new Bridge, is set very crookedly to the River, and the arches do not afford sufficient room for the waters to pass in times of flood; this Bridge might be enlarged by adding one or two new arches to its south end, which would give a very considerable additional Water-way, and would thereby tend to lessen the floods: the fall between the upper and lower Bridges of Portarlington is 1 foot 6 inches, and the distance is 50P. Between the lower Bridge and Bracklin the vale of the River is narrow; at Bracklin it expands and continues of considerable width to the Mill of Lea below Lea Castle; the rapidity of the River is in this part considerably impeded by a long Island which divides it into two separate branches, both of which are extremely irregular in their depths, varying frequently from one to eight feet in the distance of a few perches; these obstacles should be removed; the fall from the lower Bridge of Portarlington to the Mill of Lea is 3 feet, and the distance is 1M. 7F. 10P.

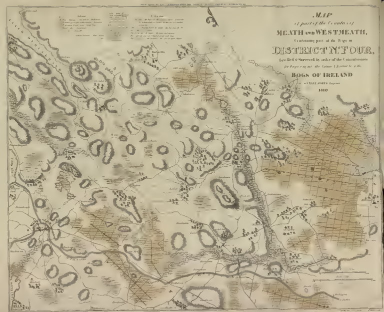
Below Lea Castle there is an irregular Weir thrown across the River, for the purpose of raising water to supply the Mill of Lea, this Weir throws back water for a considerable distance, and in times of flood does great damage,

Weirs properly constructed, that is placed diagonally across the River, or pointed, have no tendency to create floods, as on account of their construction they afford an additional superficial Water-way, proportioned to the space which they occupy, whilst Weirs as they are commonly formed, that is, nearly at right angles with the stream, cause an impediment proportioned to their bulk, without affording any additional surface for the discharge of the water; this unfortunately is usually the case in the construction of Weirs for small Mills; and it is to be doubted whether the benefit which a country may derive from the proximity of a small Mill is not frequently more than counterbalanced by the damage done by back water.

Between the Mill of Lea and the junction of the River Barrow with the Little Barrow River, the fall is very considerable, being 11 feet, and the distance but $2\frac{1}{2}$ miles; however, like the upper part of the River, its course is impeded by shallows, particularly below Belaw Bridge, where the bottom is perhaps more irregular than in any other part.

The beneficial effects that may be derived from occasional flooding of lands, where the waters retire quickly of themselves, or can be brought under command by artificial means, cannot be doubted, unless the deposite made by such floods be of a quality injurious to vegetation; but I believe every one will agree as to the propriety of preventing the overflow of Rivers, similarly circumstanced with the Barrow, the tendency of whose floods is to deposit barren sand instead of nutritious particles of vegetable or earthy substances.

RICHARD GRIFFITH, Junior, C. E.



MAP
of part of the Counties of
MEATH AND WESTMEATH,
Containing part of the Bogs in
DISTRICT No. FOUR,
Levelled & Surveyed by order of the Commissioners
for Enquiring into the Nature & Extent of the
BOGS OF IRELAND
by JAMES JONES Engineer
1810

Appendix, No. 5.

To the Commiſſioners appointed to enquire into the Nature and Extent of the ſeveral Bogs in Ireland, and cultivating them, &c. &c. &c.

The REPORT of J. ALEX. JONES, upon the Diſtrict, No. 4.

Gentlemen,

CONFORMABLY to the general directions conveyed to your Engineers for Surveying and making Remarks for aſcertaining the practicability of Draining and Improving the different Bogs in ſuch Diſtricts as you have judged moſt expedient to lay out, I have now the honour to lay before you my Survey of Diſtrict No. 4, containing the Bogs in part of the counties of Meath, Weſtmeath, and King's County.

Diſtrict, (No. 4.)

The Bog of the greateſt extent in this Diſtrict lies immediately north and eaſt of the Hill of Croghan, in the King's County, and extends into the county of Weſtmeath; the longitudinal diſtance from Mullagharuſh to near Rattin Caſtle being 7 miles and a half, and the diſtance acroſs the Bog from Tubberdaly to Sidebrook, near Beggars Bridge, being four miles. This Bog contains 11,895 Iriſh, or 19,274 Engliſh acres, and I have eſtimated it in four Diviſions, according to the local circumſtances of its ſituation, as will be ſeen by the Table of References and Eſtimate.

Bog north of Croghan Hill, the moſt extenſive in Diſtrict.

The Bog of the next greateſt extent lies on the eaſtern extremity of the county of Weſtmeath, near the village of Rathfarn, and extends into the county of Meath, towards Trim; the longitudinal diſtance from near Islandford Bridge to Coxtown being four miles and a half, the breadth from Bracklin to Carranstown three miles and a half.

This Bog contains 5,947 Iriſh, or 9,634 Engliſh acres. The other Bogs in this Diſtrict are in general detached from each other.

Bog of next greateſt extent on eaſtern extremity of County Weſtmeath.

With reſpect to the origin and growth of the Bogs in this Kingdom, I believe it is pretty generally known and underſtood that the ſubſtance of which they are compoſed is vegetable matter in various ſtages of decompoſition, reſting on an under ſtrata, in general of blue or yellow clay or gravel, and frequently of marle, the depth of which below the ſurface varies from ten to forty feet, and is ſcarcely ever regular for any great extent, as will be ſeen by the Sections taken for the main and tranſverſe lines of Drainage.

Origin and growth of Bogs.

Bogs in general are more or leſs ſaturated with water, the cauſe of which is, either ſprings from the under ſtrata on which they reſt, or thoſe iſſuing from the adjoining high lands, or from rain falling on their ſurface. The tenacity of the vegetable matter of which they are compoſed cauſes the water in the latter inſtance to be retained on their ſurface, by which means vegetation is chilled, except for the warmeſt months in the year, when the heat of the ſun abſorbs a great portion of the moiſture, and cauſes a partial growth of heath, moſs, and graſs, which by the winter's rain is again deadened and decompoſed. A ſucceſſion of the above circumſtances has, I conceive, tended much to the growth of Bogs in this Kingdom from ſwampy marſhes or ſtagnant pools to their preſent ſtate.

Cauſes of wetneſs in Bogs; the tenacity of the matter cauſes the water to lie on the ſurface.

Circumſtanced as the Bogs are in this Diſtrict, their reclamation could be much more eaſily effected than appears at firſt view, the outlets or diſcharging points of their waters lying in general ſo much below their ſummits, that the Drains executed as marked on the accompanying Map, would carry off all the water of the Bog ſo effectually, that in the courſe of a ſhort time they could be rendered fit to receive agricultural improvements.

Bogs in this Diſtrict eaſily reclaimed.

The firſt good effect that would reſult from the Drainage of wet Bog, would be a general growth of heath, and graſs of a peculiar ſort, which vegetates ſpontaneouſly on the ſurface of reclaimed Bogs, and is excellent food for young cattle. As the Bogs ſubſided by the ſinking of the Drains, cattle of every deſcription might feed on them; ſo that by the expenditure of a comparatively ſmall ſum of money, the large tracts that are now in an unproductive ſtate would become ſo much paſture, a great portion of the edges of which might be immediately tilled, which improvement would extend ultimately to the centre of the Bogs.

Good effects of Drainage.

The main Drains through the Bogs are laid out (according to circumſtances) at about 80 perches aſunder, and the tranſverſe Drains, croſſing the main Drains generally at right angles to them, are alſo laid out at the diſtance of 80 perches from each other; the principal conſideration has been to point them in ſuch directions as to give the waters the greateſt fall from the ſummit of the Bog to their outlets or natural diſcharging points.

Main Drains.

Tranſverſe Drains.

The main and tranſverſe Drains through the Bogs will be found to conſolidate and cauſe them to ſubſide very conſiderably; yet, for the purpoſe of rendering them fit to receive agricultural improvements, intermediate Drains, both between the main and tranſverſe lines, will be indiſpenſably neceſſary: theſe Drains to be midway between the others, and ſunk five feet deep.

Intermediate, or Surface Drains neceſſary.

Wet Bogs will not admit of the main and tranſverſe Drains to be ſunk at once to their full depth, as the ſides would have a tendency to cloſe together, and the bottom to riſe and ſwell up. Time, therefore, muſt neceſſarily be given for the ſinking.

Wet Bogs will not admit of deep Drains being ſunk at once to their depth.

Size of Main and Transverſe Drains.

The main Drains through deep and wet Bogs, I propoſe to be ſunk from 14 to 16 feet deep, and the tranſverſe Drains to be ſunk from 10 to 12 feet deep; the whole to be two feet wide at bottom when finiſhed.

The annexed PLAN of the method to be purſued in ſinking Drains in Bogs, will, I truſt, be found clear and ſatisfactory.

Method of working Drains in Bogs.
Pl. VI.

The mode that I have found moſt eligible to adopt in executing Drains through Bogs, is to begin by firſt opening them (like E in the Plan) viz. 4 feet wide at top, ſinking them 3 feet deep, and making them one foot wide at bottom throughout their whole extent. When the Bog by this means has ſubſided (a foot or eighteen inches) to *a b*, which it will do in the courſe of a very ſhort time, immediately adjoining the Drain, repeat the ſinking by taking off one foot on each ſide of them, which will give ſufficient room for ſinking them two feet deeper. As the Bog will gradually ſubſide to *c d*, *e f*, *g h*, *i k*, *l m*, *n o*, the above operation of reſinking the Drains ſhould be continued until the whole be ſunk to the depth intended; it is on the above principle that I have calculated the Drains to be ſunk through the Bogs in this Diſtrict.

A B C D is the Section of a Main Drain 16 feet deep, 2 feet wide at bottom, ſlopes of the ſides 6 inches horizontal to 12 inches perpendicular. A perch (21 feet in length) of a Drain of the above Section would contain 124 cubic yards of excavation; but by ſinking the Drains in the manner above deſcribed, and according to the ſeveral repeated cuttings E, F, G, H, I, K, L, M, a perch would only contain 66 cubic yards when excavated to the bottom, provided the Bog ſubſided in the proportion that is here amplified, which in this inſtance is 9 feet from the original ſurface to the ſurface which the Drains would be at when finiſhed; they will then be nine feet wide at top and 7 feet depth. By adopting this method a ſaving is made in actual excavation of 58 cubic yards of Bog and fluid matter, contained in the ſpaces of A P N, Q B O, which would inevitably be encountered in the inſtance of opening Drains to the full width at top, according to the depth to be ſunk.

Saving in excavation by executing Drains in manner here propoſed.

Saving in execution of Drains, with reſpect to firm and wet Bogs.

In moderately firm Bogs, the ſaving in point of execution will not be quite ſo much as in the above example; but in the wet Bogs it will be found to be probably more, as the ſubſiding will be greater.

In almoſt all inſtances of draining Bogs I conceive that the above is not only the beſt practical method to purſue, but alſo the moſt eligible and economical for cutting Drains; the widening and ſinking the Drains being repeated as the Bog conſolidates, it is evident that the ſides will not have the ſame tendency to collapſe, nor the bottom to ſwell up, as would be the caſe were the Drains to be opened to the full width requiſite to ſink them at once to the propoſed depth.

Bottom of Drains to be bored during operation of ſinking.

During the operation of ſinking the Drains, frequent trials ſhould be made to give vent to the water from the bottom and under ſtrata, by boring to it with an auger of about three or four inches in diameter. This operation is attended with very little labour, and the beneficial effects of it I have frequently obſerved: as, whatever ſprings may be at bottom, by this means will get vent, and diſcharge by the Drains, which would otherwiſe continue to ſaturate, and keep the Bogs afloat.

The whole ſurface of Bog will not ſubſide in ſame proportion as adjoining the Drains.

It is by no means to be inferred that the entire ſurface of the Bog will ſubſide in the ſame proportion as that adjoining the Drains; but this circumſtance need not impede the widening and deepening of the Drains in the manner above deſcribed, as, by the time that the firſt ſinking is performed throughout their extent, the Bog will be ſo much ſubſided at the place where firſt opened, that it will be in a ſtate to admit of being proceeded on with the ſecond cutting, and ſo progreſſively till the whole is finiſhed.

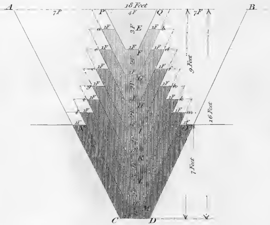
Contents of Bogs in Diſtrict.

The Bogs in this Diſtrict, ſurveyed with a view to their reclamation, contain in the aggregate 26,157 Iriſh or 42,370 Engliſh acres. I have numbered them from one to fifteen; each of which I ſhall deſcribe ſeparately, according to the annexed Table.

TABLE OF BOGS.

No.	NAMES.	Content in Iriſh Acres	Content in Engliſh Acres	Higheſt Summit of Bog over High Water in Dublin Bay.	Loweſt part of Drainage below the Summit of Bog.
1.	The Bog of Kilcumney, Glackstown and Mabestown	666	1,079	286. 6.	26. 8.
2.	Bracklin, Lyslogher, Kilconnican, and Riverdale -	5,947	9,634	279. 9.	60. 9.
3.	Rathconnel, Wood Down and Great Down - -	1,602	2,595	336. 2.	43. 5.
4.	Knockerville and Clongowney - - - -	1,011	1,646	314. 10.	22. 6.
5.	Clonereive and Anadruce - - - - -	795	1,288	255. 5.	24 5.
6.	Claremount, Hightown and Lowtown - - -	558	904	309. 4.	33. 1.
7.	Lilleput and Middleton - - - -	651	1,054	283. 4.	31. 0.
8.	Tyrrel's Paſs and New Foreſt to L. Ennel - -	1,133	1,835	308. 2.	57. 0.
9.	Mooroe and Gurtumbeg - - - - -	565	916	319. 6.	30. 0.
10.	Toar Mullagharuth to Road at Derrycoffee - -	2,342	3,792	326. 8.	35. 0.
11.	Ring, Sidebrook and Tubberdaly, to Road at Derrygreen	4,982	8,071	282. 0.	46. 0.
12.	Derrygreen, Drummon and Carrick, to Miltown R.	3,801	6,158	262. 3.	15. 7.
13.	From Miltown-River to Ratten Caſtle - - -	772	1,253	268. 7.	32. 2.
14.	Baltinoran and Rawson - - - - -	853	1,382	267. 2.	40. 6.
15.	Glanderawaroge - - - - - -	479	763	258. 0.	38. 9.
		26,157	42,370		

PLAN FOR EXECUTING DRAINS IN BOGS



The Section A B C D Contains in One Perch		124	*Cubic Yards*
The first Cutting E Contains in d°	5½		
2d . d° F . d°	5½		
3d d° G . . . d°.	6¾		
4th .. d°. .. H ... d°. ...	7		
5th . d°. . I ... d°	.. 8		
6th ... d° K.. d°.	... 10		
7th d°. . L d°.	11¾		
8th. ... d° . M ... d°.	.. 12	66	
	difference	58	

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Ordered by the HOUSE OF COMMONS *to be Printed 1st April 1811.*

No. 1. The Bog of Kilcumney, Glackstown, and Mabestown.

Bog (No. 1.)

Weſt side of the River Deel the Bog is wet and soft; on the eaſt side it is firm brown Bog Through this Bog I propose to run three main lines, viz. A B, B C, B D. The loweſt point of Drainage is to the Lake at C, which is 26 feet 8 inches below the summit of the Bog; it will be requisite to widen and sink the river from C to Rathfarn. In many parts it is sufficiently deep, and will require little labour; the deepening of the River will also reclaim between 3 and 400 acres of low bottom ground, which is now of little value, being covered with water six months in the year.

River Deel to be sunk.

The under ſtrata of this Bog is principally gravel, except adjoining the River, where it is chiefly marle and blue clay.

The proprietors are Mr. Smith of Drumcree, Mr. Smith of Barbavilla, Mr. Montford, &c.

No. 2. The Bog of Bracklin, Lysclogher, Killeconnican, and Riverdale.

Bog (No. 2.)

This Bog is the second in extent in this Diſtrict. The summit of it is near Bracklin, and there is a fall to the River Deel at L of 41 feet, and to the ſtream at Carronstown of 60 feet. The general declivity of the Bog is from weſt to eaſt; and it being wet, deep, and of a very spongy nature, I have calculated on the main Drains being sunk 16 feet in depth through it. The edge of the Bog throughout its whole circumference (except at Bracklin and Ballyhealy) is considerably below the bottom of the main Drains, as will be seen by referring to the Sections of the lines A B, C D, &c.

At Bracklin and Ballyhealy the surface of the ground abounds with large masses of limeſtone rock. The reſt of the Bog is in general surrounded by limeſtone-gravel mixed with clay.

Limeſtone on the surface adjoining the Bog.

There are several small bills or derrys of limeſtone-gravel interspersed through this Bog, which would be excellent manure to spread on it when drained.

The high Road from Mullingar to Trim is the only one that runs through this Bog; but there is another Road that is complete through it as far as the County of Weſtmeath extends. The part in the county of Meath is laid out, but not executed.

The proprietors of this Bog are Lord Longford, Lord Darnley, Mr. James Fetherſton, Mr. John Fetherſton, Mr. Batty, Mr. Browne, Mr. Peters, Mr. Kellett, Mr. Briscoe, Mr. Charles.

No. 3. The Bogs of Rathconnell, Wood Down and Great Down.

Bog (No. 3.)

The line of the Royal Canal was formerly laid out nearly through the centre of this Bog. Many Drains were made in it, in consequence of which it has become very firm. The principal supply of fuel for Mallingar is taken from thence.

Bog (No. 4.)

No. 4. is part of the above Bog, but separated from it by the line of the Royal Canal. This is also tolerably firm, although one of the deepeſt Bogs in this Diſtrict, being in parts 39 feet deep. There is abundance of manuring gravel and limeſtone in the hills and about the edges of these Bogs.

The loweſt point for the general Drainage for the above would be the River that passes under the Canal (near D) at Heathstown. The principal Owners are Lord Longford, Mr. Rochfort, Mr. Adams, Mr. Cook.

No. 5. The Bog of Anadruce and Cloncreive.

Bog (No. 5.)

The centre of this Bog is much lower and firmer than the ends near A and B. The ends are red spongy Bog: the centre is brown Bog of a good quality for fuel. The Royal Canal is executed along the northern edge of this Bog, and a great quantity of turf is sent by it from hence to Dublin.

A collateral branch from the canal at Hyde Park has been projected through the Bog to the town of Kinnegad.

The owners are Mr. D'Arcy, Mr. James Fetherſton, and Lady Jane Loftus.

No. 6. The Bog of Claremount and Hightown.

Bog (No. 6.)

This is a very firm Bog, and easily reclaimed, the depth not being very great.

The owners are Mr. Dopping and Mr. Houghton.

No. 7. Lilleput and Middleton Bog.

Bog (No. 7.)

This Bog lies generally on a ſtrata of blue clay from one to three feet deep, under which is limeſtone-gravel to an unknown depth.

The principal proprietor, Mr. Berry, has made several Drains through the part adjoining the ſtream at B; and has reclaimed a portion of it, and made a conſiderable plantation on the edge near Cloonah, and the Road leading to Caſtletown.

River Bruſna to be ſunk.

By ſinking the River Bruſna from Ballinagore towards Midgemount, as eſtimated, a great tract of the ſwampy ground on each ſide up to Lough Ennel would be laid dry, which is now under water.

Bog (No. 8.)

No. 8. The Bog of Tyrrell's Paſs and Dalystown.

This Bog, though deep, is very firm; the under ſtrata is exceeding irregular, as will be ſeen by the Section of the main lines of F E, D C.

Dalystown is a firm black Bog, much cut away for fuel. The land on the weſtern edge abounds with limeſtone and manuring gravel of the beſt quality.

The owners are Lord Belvedere, Mr. Vignolles, Mr. Daniell, Lady Milltown, Mr. Gibbons, and Major Irwin.

Bog (No. 9.)

No. 9. The Bog of Mooroe and Gurtumley.

This is a long narrow ſtretch of Bog, the bottom of which is very irregular. It is very firm; ſurrounded with limeſtone and manuring gravel; and eaſily reclaimed on account of its elevation.

The principal owners are Lord Kilmaine, Lord Belvedere, and Mr. Hugh Shiel.

Bogs (Nos. 10, 11, & 12.)

Nos. 10, 11, and 12, the Bogs North and Eaſt of the Hill of Croughan.

This extenſive tract of Bog is peculiarly well circumſtanced to admit of being drained in a moſt effectual manner. The fall of the main Drain from C to D is 22 feet, from D to K is 25 feet; and from K to S, on the Milltown River, is 21 feet. The total fall from C to S is 68 feet.

The Bog No. 10. is generally brown Bog, tolerably firm. No. 11, between Derryarkin and Sidebrook, good black Bog. The part between Derryarkin and Loughnaſhade brown, and pretty firm. No. 12. in general is alſo brown Bog.

Tract of Marl in Bog near the ſurface.

About three quarters of a mile from the Road at D towards K (Bog No. 11) there is a tract of about 40 acres in extent, of white rich marl, lying very near the ſurface, and in depth from 12 to 15 feet. This is the only place in this extenſive Bog where ſprings of water iſsue from the bottom, and as it lies directly between two of the higheſt hills in the Country, viz. Croughan and Grewbawn, it is highly probable that the ſprings take their riſe in them, and get vent here. Theſe ſprings run into the Yellow River, which in this Bog is taken up as a ſupply for the Grand Canal, near N, paſses between Loughnashade and the eaſt ſide of the Bog, and falls into the Canal at O.

Supply from Yellow River to Grand Canal not diminiſhed.

In the event of draining the Bog this ſupply may be taken up near M, and conveyed into the Canal by a catchwater Drain along the edge of the Bog, near the foot of the Hill of Croughan, and fall into its preſent courſe at the road near Tubberdaly.

Propoſed new Road from Milltown to Gar Bridge.

Through the Bog No. 12. an eligible line of road might be made between Milltown and Gar Bridge, which would not only ſerve to convey the future produce of the Bog to the Grand Canal, &c. but would be of eſsential benefit to the Country at large.

Limeſtone and manuring-gravel is in great abundance in the immediate vicinity of all theſe Bogs.

The principal owners of No. 10, are Lord Belvidere, Mr. Uſher, Mr. Vignolles, Mr. North, and Mr. Magan. The owners of No. 11, are Lord Charleville, Mr. John Rochfort, and Mr. Neſbitt. The owners of No. 12, are Mr. Guſtavus Hume Rochfort, Mr. Cawroon, Mr. Tyrell, and Lady Giffard.

Bog (No. 13.)

No. 13. Ratten Bog.

This is a very wet ſpongy red Bog; but its elevation above Milltown River being 32 feet, its drainage can be eaſily effected. The principal owner is Lord Laneſborough.

Bog (No. 14.)

No. 14. The Bog of Baltinoran and Rawſon.

The part of this Bog through which the line A B runs, is a firm brown Bog; the other part is a brown-ſoft Bog, and eaſily drained, the ſummit being 40 feet above the ſtream at D. The edges of this Bog are remarkably good for fuel. The owners are Mr. Fitzgerald, Mr. Cawroon, and Mr. Haughton.

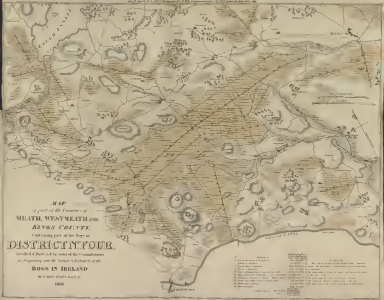
Bog (No. 15.)

No. 15. The Bog of Glanderawaroge.

This is a red ſpongy Bog; but as it lies high over the River Boyne can eaſily be drained into it; the fall from its ſummit being 38 feet.

The

Plan II. Appendix to SECOND Report from the COMMISSIONERS on the BOGS of IRELAND. 1811



MAP
of part of the Counties of
MEATH, WESTMEATH AND
KINGS COUNTY,
Containing part of the Bogs in
DISTRICT Nº. FOUR,
Levelled & Surveyed by order of the Commissioners
for Enquiring into the Nature & Extent &c of the
BOGS IN IRELAND
By J. AUST. JONES Engineer
1810

The owners are Mr. Dawes and Mr. Wilson.

Throughout the whole of this Diſtrict but few attempts have been made towards the reclamation of any considerable part of the large tracts of Bog which it contains. The principal places that have been improved are at Toar, Middleton, and Killbrennan near Tyrell's Pass, and Kilduff near Philipstown. The whole extent reclaimed does not exceed 200 acres.

Few parts of Bog reclaimed.

The mode uſually pursued in the reclamation of such parts of Bogs as have come under my obſervation was, after the ſpace had been well drained, the surface in general was either pared off, ploughed, or dug up, and thrown into heaps (if black Bog) through which a quantity of gravel or clay was mixed. These heaps were then fired, the aſhes from it was afterwards spread on the surface, and either dug or ploughed in. This produced an excellent crop of rape; crops of potatoes and oats succeeded this, after which it was generally laid down with grass seed, and by the application of such manure as was moſt convenient, produced very good crops of meadow.

The uſual mode of reclaiming Black Bogs.

In spongy red Bogs, the process of burning is not usually pursued; the surface, when dry, being so light, that little aſhes, and those of inferior quality, would be produced. Marle, in this inſtance (if to be had) is the beſt manure that can be applied to the surface; a thin layer of which would be ſufficient to produce potatoes, oats, flax, &c. in succession.

Reclaiming Brown or Red Bog.

The trees usually planted in such parts as have been improved are Scotch fir, spruce, larch, alder, and birch, all of which seem to thrive well.

Plantations on Bog Edges.

In the borings taken to ascertain the depths of the Bogs in this Diſtrict, no timber was met with under the surface, except near their edges; and this was usually oak, deal, or yew. Few mills will be injured by the drainage of the Bogs in this Diſtrict. On the contrary, the supply of water to many will be considerably increased.

Timber only found near edges of Bogs under the surface.

Mills not injured by the Drainage.

The embankments of the Grand and Royal Canals will not be affected by the Drainage. The supply to the latter, which runs into the eighteenth level (17 miles in length) near Killucan, will be greatly augmented.

Grand and Royal Canal Embankments not affected.

Supply to Royal Canal increased.

With reſpect to forming navigable Drains through such Bogs as lie contiguous to the Grand and Royal Canals, so as to communicate with them without Locks, I conceive that their execution in general would interfere with their effectual Drainage. When the Bog ſhould be drained so as to be fit to receive agricultural improvements, the main Drains might, with considerable advantage, be made navigable, for the purpose of conveying manure into the Bogs, and their future produce out of them.

Navigable Drains.

The quantity of the Bogs cut away for fuel (that have been surveyed) in this Diſtrict, I have computed to about 1,300 acres. This bears a very small proportion to the great tract that would be rendered eligible for that as well as other national purposes, by the carrying of the great scheme of Drainage into execution.

Proportion of cut away Bogs very small.

I have the honour to be,
Gentlemen,
Your moſt obedient and very humble Servant,
J. ALEX. JONES.

Dublin,
February 1811.

ESTIMATE of the Expense of DRAINING the BOGS in Diſtrict No. 4.

NAMES of BOGS, &c.	No. of Perches in Length	Depth of Sinking.	Width of Bottom of Drain	Rate per Perch.	AMOUNT.
No. 1.—The Bog of KILCUMNEY, GLACKSTOWN, and MAKESTOWN.				£. s. d.	£. s. d.
Sinking Main Drain - A B - - -	338.	16.	2	1 7 6	464 15 —
D° - - - - - - B C - - -	200.	12.	2.	— 17 1	160 16 8
D° - - - - - - B D - - -	296.	14.	2.	1 2 1	326 16 8
Sinking Transverse Drains - - -	640.	10.	2.	— 12 11	413 8 8
D° Surface Drains - - - -	1,474	5.	1.	— 1 6	110 11 —
Amount - -	- -	- -	- -	£	1,476 8 —

continued

Eſtimate of the Expense of Draining the Bogs in Diſtrict No. 4.—*continued.*

NAMES of BOGS, &c.	No. of Perches in Length.	Depth of Sinking.	Width of Bottom of Drain.	Rate per Perch.			AMOUNT.		
				£	s.	d.	£.	s.	d.
No. 2.—The Bog of BRACKLIN, LYSCLOGHER, KILLECONNICAN and RIVERDALE.									
Sinking Main Drain - A B	524.								
D° - C D	722.								
D° - E F	580.								
D° - G H	558.								
D° - I K	522.								
D° - L M	1,276.								
D° - N O	564.								
D° - P Q	304.								
	5,042.	16.	2.	1	7	6	6,932	15	—
D° - R S	324.	14.	2.	1	2	1	357	15	—
D° - T U	460.	14.	2.	1	2	1	507	18	4
D° - V W	524.	16.	2.	1	7	6	720	10	—
D° - Y Z	520.	16.	2.	1	7	6	715	—	—
D° - X Y	336.	10.	2.	—	12	11	217	—	—
Sinking Transverse Drains	11,374.	10.	2.	—	12	11	7,345	14	2
D° Surface Drains	18,557	6.	1.	—	1	6	1,391	15	1
Amount	- -	- -	- -	-		-	18,188	7	7
No. 3.—The Bog of RATHCONNEL, WOOD DOWN and GREAT DOWN.									
Sinking Main Drain - A B	300.	14.	2.	1	2	1	331	5	—
D° - C D	344.	10.	2.	—	12	11	222	3	4
D° - E F	430.	12.	2.	—	17	1	367	5	10
Sinking Transverse Drains	720.	14.	2.	1	2	1	795	—	—
D° - D°	1,144.	10.	2.	—	12	11	738	16	8
D° Surface Drains	1,938.	6.	1.	—	1	6	145	7	—
Amount	- -	- -	- -	-		-	2,599	17	10
No. 4.—The Bog of KNOCKERVILLE and CLONGOWNEY, South of Royal Canal.									
Sinking Main Drain - A B	666.	14.	2.	1	2	1	735	7	6
D° Transverse Drains	1,134.	10.	2.	—	12	11	732	7	6
D° Surface Drains	1,800.	6.	1.	—	1	6	135	—	—
Amount	- -	- -	- -	-		-	1,602	15	—
No. 5.—The Bog of CLONCREIVE and ANADRUCE.									
Sinking Main Drain - A B	848.	16.	2.	1	7	6	1,166	—	—
D° Transverse Drains	1,747.	10.	2.	—	12	11	1,128	5	5
D° Surface Drains	2,595.	6.	1.	—	1	6	194	12	6
Amount	- -	- -	- -	-		-	2,488	17	11

Estimate of the Expense of Draining the Bogs in District No. 4.—*continued.*

NAMES of BOGS, &c.	No. of Perches in Length.	Depth of Sinking.	Width of Bottom of Drain.	Rate per Perch.			AMOUNT.		
				£.	*s.*	*d.*	*£.*	*s.*	*d.*
No. 6.—The Bog of CLARLMOUNT, KYRAWN, HIGHTOWN, and LOWTOWN.									
Sinking Main Drain - A B - - -	356.	16.	2.	1	7	6	489	10	—
D° - - - - - - C D - - -	364.	10.	2.	—	12	11	235	1	8
D° - - - - - - E F - - -	130.	10.	2.	—	12	11	83	19	2
Sinking Transverse Drains - - -	798.	10.	2.	—	12	11	515	7	6
D° Surface Drains - - - -	1,396.	6.	1.	—	1	6	104	14	—
Amount - -	- -	- -	- -	-	-	-	1,428	12	4
No. 7.—The Bog of LILLEPUT and MIDDLETON.									
Sinking Main Drain - A B - - -	368.	16.	2.	1	7	6	506	—	—
D° - - - - - - C D - - -	284.	12.	2.	—	17	1	242	11	8
D° - - - - - - E F - - -	336.	12.	2.	—	17	1	287	—	—
Sinking Transverse Drains - - -	1,124.	10.	2.	—	12	11	720	15	—
D° Surface Drains - - - -	2,102.	6.	1.	—	1	6	157	13	—
Amount - -	- -	- -	- -	-		-	1,913	19	8
No. 8.—The Bog of TYRRELL'S PASS, NEW FOREST, and DALYSTOWN, to L. ENNEL.									
Sinking Main Drain - A B - - -	486.	12.	2.	—	17	1	390	16	6
D° - - - - - - C D - - -	338.	14.	2.	1	2	1	373	4	2
D° - - - - - - F D E - - -	626.	14.	2.	1	2	1	691	4	2
Sinking Transverse Drains - - -	2,293.	10.	2.	—	12	11	1,480	19	11
D° Surface Drains - - - -	3,743.	6.	1.	—	1	6	280	14	6
Amount - -	- -	- -	- -	-		-	3,216	19	3
No. 9.—The Bog of MOOROE and GURTENLEY.									
Sinking Main Drain - A B - - -	1,004.	10.	2.	—	12	11	648	8	4
D° Transverse Drains - - -	952.	10.	2.	—	12	11	614	16	8
D° Surface Drains - - - -	1,956.	6.	1.	—	1	6	146	14	—
Amount - -	- -	- -	- -	-		-	1,409	19	—
No. 10.—The Bog of MULLAGHARUSH and DERRYCOFFEY									
Sinking Main Drain - A B - - -	1,006.	14.	2.	1	2	1	1,110	15	10
D° - - - - - - C D - - -	388.	12.	2.	—	17	1	312	—	4
D° - - - - - - E F - - -	458.	12.	2.	—	17	1	425	4	2
D° - - - - - - F G - - -	566.	14.	2.	1	2	1	624	19	2
D° - - - - - - H I - - -	430.	14.	2.	1	2	1	474	15	10
D° Transverse Drains - - -	1,830.	14.	2.	1	2	1	2,020	12	6
D° - D° - - - - -	160.	12.	2.	—	17	1	128	13	4
D° - D° - - - - -	2,286.	10.	2.	—	12	11	1,476	7	6
D° Surface Drains - - - -	7,249.	6.	1.	—	1	6	543	12	10
Amount - -	- -	- -	- -	-		-	7,117	1	6
No. 11.—The Bog of RING, SIDEBROOK, and TUBBERDALY, to Road at Derryarkin.									
Sinking Main Drain - D K - - -	820.	14.	2.	1	2	1	905	9	2
D° - - - - - - F L - - -	822.	12.	2.	—	17	1	702	3	4
D° - - - - - - M O - - -	837.	14.	2.	1	2	1	914	16	9
D° - - - - - - N O - - -	1,023.	14.	2.	1	2	1	1,129	11	3
Sinking Transverse Drains - - -	4,886.	10.	2.	—	17	1	3,663	18	—
D° Surface Drains - - - -	12,698.	6.	1.	—	1	6	952	7	—
Amount - -	- -	- -	- -	-		-	11,394	16	4

Eſtimate of the Expense of Draining the Bogs in Diſtrict No. 4.—*continued.*

NAMES of BOGS, &c.	No. of Perches in Length.	Depth of Sinking	Breadth at Bottom of Drain	Rate per Perch			AMOUNT.		
No. 12.—The Bog of DERRYGREEN, DRUMMON, and CARRICK, to Miltown River.				*£.*	*s.*	*d.*	*£.*	*s.*	*d.*
Sinking Main Drain - - P Q - - -	778.	14.	2.	1	2	1	859	—	10
D° - - - - - - K S - - -	752.	14.	2.	1	2	1	830	6	8
D° - - - - - - L W - - -	654.	16.	2.	1	7	6	899	5	—
D° - - - - - - V U - - -	268.	16.	2.	1	7	6	368	10	—
D° - Transverse Drains - -	1,870.	14.	2.	1	2	1	2,064	15	10
D° - - - D° - - - -	3,066.	10.	2.	—	12	11	1,976	15	10
D° - Surface Drains - - -	7,388.	6.	1.	—	1	6	554	2	—
Amount - -	- -	- -	- -	-		-	7,552	16	2
No. 13.—The Bog of RATTEN, from Milltown River to Ratten Caſtle.									
Sinking Main Drain - - Q R - - -	392.	16.	2.	1	7	6	539	—	—
D° - - - - - S T - - -	640.	14.	2.	1	2	1	706	13	4
D° - Tranverse Drain - - -	431.	14.	2.	1	2	1	475	17	11
D° - - - D° - - - -	984.	10.	2.	—	12	11	635	10	—
D° - Surface Drains - - -	2,447.	6.	1.	—	1	6	183	10	6
Amount - -	- -	- -	- -	-		-	2,540	11	9
No. 14.—The Bog of BALTINORAN and RAWSON.									
Sinking Main Drain - A B - - -	366.	14.	2.	1	2	1	404	2	6
D° - D° - - - C D - - -	320.	16.	2.	1	7	6	440	—	—
D° - Transverse Drains - - -	988.	14.	2.	1	2	1	1,090	18	4
D° - - - D° - - - - -	496.	10.	2.	—	12	11	320	6	8
D° - Surface Drains - - - -	2,170.	6.	1.	—	1	6	162	15	—
Amount - -	- -	- -	- -	-		£.	2,418	2	6
No. 15.—The Bog of GLANDERAWAROGE.									
Sinking Main Drain - A B - - -	404.	16.	2.	1	7	6	555	10	—
D° - Transverse Drains - - - -	1,040.	10.	2.	—	12	11	671	13	4
D° - Surface - D° - - - -	1,444.	6.	1.	—	1	6	108	6	—
Amount - -	- -	- -	- -	-		£.	1,335	9	4
SINKING RIVERS.									
Sinking Mungagh Bridge to Milltown River in Bog - - - - - - -	245.	- -	- -	1	—	—	245	—	—
Sinking River Deel from Dysart to Rathfain	1,298.	- -	- -	—	15	—	973	10	—
Sinking River Bruſna from Ballinagore towards Midgemount - - - - -	258.	- -	- -	1	—	—	258	—	—
Sinking Stream between White Lake and Ballrowan - - - - - -	300.	- -	- -	—	10	—	150	—	—
Amount - -	- -	- -	- -	-		£.	1,626	10	—

ABSTRACT OF ESTIMATES.

	NAMES of BOGS.	Content in Iriſh Acres.	Content in Engliſh Acres.	Amount of Eſtimate.
				£. s. d.
1.	For Draining the Bogs of Kilcumney, Glackstown, and Mabestown - - - - - -	666	1,079	1,476 8 —
2.	D° - the Bogs of Bracklin, Lisclogher, Killiconnican, and Riverdale - - - -	5,947	9,634	18,188 7 7
3	D° - the Bogs of Rathconnel, Down, and Great Down - - - - - -	1,602	2,595	2,599 17 10
4.	D° - the Bogs of Knockerville and Clongawney -	1,011	1,646	1,602 15 —
5.	D° - the Bogs of Cloncreive and Annadruce -	795	1,288	2,488 17 11
6.	D° - the Bogs of Claremount, and Hightown and Lowtown - - - - - -	558	904	1,428 12 4
7.	D° - the Bogs of Lilliput and Middleton - -	651	1,054	1,913 19 8
8.	D° - Tyrrel's Pass and Newforest to L. Ennell -	1,133	1,835	3,216 19 3
9.	D° - Mooroe and Gurtumly - - - -	565	916	1,409 19 —
10.	D° - Toar Mullagharuſh to Road at Derrycoffey -	2,342	3,792	7,117 1 6
11.	D° Ring Sidebrook and Tubberdaly to Road at Derrygreen - - - - - -	4,982	8,071	11,324 16 4
12.	D° - Derrygreen, Drummon, and Carrick, to Milltown River - - - - -	3,801	6,158	7,552 16 2
13.	D° - Ratten, from Milltown River to Ratten Caſtle	772	1,253	2,540 11 9
14.	D° - Balterorran and Rawson - - - -	853	1,382	2,418 2 6
15.	D° - Glanderrawarroge - - - - -	479	763	1,335 9 4
		26,157	42,370	66,614 14 2
	SINKING RIVERS.			
	Sinking from Mungagh Bridge to Milltown River in Bog, 254 perches, at 20/ - - - - - - - -		£. s. d 145 — —	
	Sinking River Deel from Dysart to Rathfarn, 1,298 perches, at 15/ per perch - - - - - - - -		973 10 —	
	Sinking River Brusna from Ballinagore towards Midgemount, 258 perches, at 20/ per perch - - - - -		258 — —	
	Sinking Stream between White Lake and Ballyroan, 300 perches, at 10/ per perch - - - - - - - -		150 — —	
				1,626 10 —
			£.	68,241 14 2
	Contingent Expenses and Superintendance, &c. &c. at £. 10 per Cent.			6,824 2 5
			Amount of Eſtimate - £.	75,065 6 7

A MAP OF
FIFTEEN DIVISIONS OF DISTRICT NUMBER 1
BOGS OF IRELAND
REFERENCE

Appendix, No. 6.

To the Honourable the Commiſſioners appointed to enquire into the Nature and Extent of the ſeveral Bogs of Ireland, and the practicability of draining and cultivating them.

The REPORT of JOHN LONGFIELD, upon the Diſtrict No. 5.

Gentlemen,

I HAVE the honour to lay before you my Plans and Sections of the Diſtrict No. 5, which I truſt you will find accurately executed purſuant to your orders. I have marked, in ſtrong red dotted lines, all the Main Drains I propose on the reſpective Bogs, joined to which you will perceive the lines for Surface Drains dotted in a lighter manner, and all laid out in such directions as to unite the natural falls of the Bogs, and conduct the waters to the moſt eligible points of ventage. The Sections of Main and Catchwater Drains, &c. are ſo numerous, comprising an extent of 192 miles 7 furlongs 12 perches, that I have found it expedient to have them bound; and in order to have reference to them without confusion I have commenced at No. 1, and continued to No. 94; those corresponding numbers you will find marked on the Map, Sections, and in the detailed Reports.

Iriſh 151. 4. 24

The Bogs in this Diſtrict are so situated, and their local circumſtances in point of level so different, that in order to give the subject full consideration, and to convey my ideas as clearly as possible, I have divided them into 13 Sections or Divisions; each of those sub-denominations I ſhall treat of separately, and subjoin to the end of each detailed Report an Eſtimate of the expense, which, to the beſt of my judgment, the works proposed can be executed for. The prices I have allowed are such as works of a similar nature have been done for; and I have well founded hopes that the Eſtimates approach the truth as nearly as the nature of the subject permits.

Before I enter into a detail of the 13 Sections, I ſhall take the liberty to make a few observations on the subject in general, at the foot of which I will give an Index of the whole, pointing out the pages in my Report where the separate subjects are treated of, and also a Total of the Eſtimates.

This Diſtrict contains 44,591 acres of Bog, which extends, with little intermission, from near Banagher to the neighbourhood of Tullamore, a diſtance of about 25½ miles. It is bounded on the north by the River Brusna, nearly parallel to which, and verging many miles of those Bogs, is the line of the Grand Canal from Tullamore to Shannon Harbour; the southern boundary is an undulating country, abounding with excellent manuring gravels, but no very prominent feature (except Cloghan and Knock Hills) until you reach the Slieve Bloom Mountains; from these eminences and high lands a number of ſtreams issue, which intersect the Bogs in various directions; the different courses and channels made by them I find of much importance, as they can be converted into Tap Drains, to receive the waters from my proposed Main Drains. These ſtreams also furnish water in higher situations than the Bogs, which can be conveyed into them to feed navigable cuts, and supply a sufficiency for irrigation in dry ſeaſons, which I deem of considerable importance.

Iriſh 27,528.

Iriſh about 20.

I have the satisfaction also to ſtate, that I have every where found sufficient falls from the Bogs to carry off the surface waters of them, and in general it is practicable to drain the under ſtrata, ſhould such an expensive undertaking be ever deemed advisable. But such deep sinking in the interior of the Bogs I do not conceive absolutely requisite to effect the object of Drainage (unless you reached the under ſtrata) from this very extraordinary circumſtance, that the vegetable matter of which the Bogs are composed is so far from being of a porous nature that it is perfectly retentive, of course Main Drains of even 20 feet deep and 80 perches as under, would have no more effect upon the centre of the surface between them, than if they were only sunk to the depth recommended for Surface Drains.

This may appear improbable, but nothing can demonſtrate the truth of the observation more, than simply observing, that the numerous duck-pools, and lodgments of water in the Bogs, are almoſt all upon different levels, whereas if there exiſted any internal communication this would not be the case. Under this impression I have formed my ſyſtem of Drainage to be composed of numerous Main, Receiving, and Surface Drains, of moderate dimensions. The circumſtance of this extraordinary quality of the soft Bog ſtuff is fully proved in the Bog of Ballycotton (see Report upon the 10th Division, page 136.) where there exiſts two considerable bodies of water near each other, differing two feet and an half in their levels.

I have also found, in many situations, good manuring gravel, sufficiently near the surface to be raised without incurring much expense or trouble; where such cases occur I have particularly noticed them on the Map, and would recommend raising the ſtuff to the surface; but where the manures cannot be had nearer than from 8 to 10 feet, I would not adviſe any attempt to diffuſe their benefits.

Every where possible I have attended to three principal objects in laying down the situation of my Main Drains. Firſt, to answer as Tap Drains; secondly, as occasional channels of navigation; and thirdly, when the chief object of drainage is attained, and the Bog reduced to a ſtate of cultivation, those drains can be finally dammed up, and the water generally diffused over the surface for purposes of irrigation. The value of water manure upon dry and parched Bogs has been fully exemplified, to my utmoſt satisfaction, in the course of my late Surveys, which being commenced on the 21ſt of January and finiſhed in July, gave me an opportunity of daily witnessing the progres of vegetation in the winter, spring, and in as hot summer months as we have had in this Kingdom for many years. In the month of February I observed, particularly the Fiorin grass (so highly recommended by Dr. Richardson) growing luxuriantly in many parts of the Bog Drains, and on the sides of the Roads, during a continuance of severe wet and snowy weather; and I observed the very same grass dry up and wither as the drought approached, and continued so in April, May, and June. From the 1ſt of April till about the 20th of June, we had a continuance of extreme hot weather, during which time there was not the leaſt appearance of vegetation in the Bogs, and very little on the land; from that period to the middle of July we had many heavy ſhowers, and some conſtant days of rain, the effect of which created almoſt immediate vegetation, for in the course of those few weeks, the Bogs that before presented a surface not even affording heath itself, now produced a moſt abundant supply of sappy and luxuriant grass, which it is to be regretted could not be grazed, the Bogs being inaccessible to cattle; for although the firſt 3 or 4 inches of the surface was both dry and crisp, yet if that were broken through by man or beaſt it is a chance if ever they ſhould be able to extricate themselves. If it were possible to entertain doubts of the efficacy of irrigation on drained Bogs, this single inſtance, I truſt, will be sufficient to remove them; it is very seldom that this climate affords an opportunity of proving this fact so satisfactorily as this year; the effect of the unusual drought of this season may be presumed to have acted on the surface as effectual drainage, and the sudden fall of rain operated as an irrigation supply, which from the ſtate of the Bogs was as suddenly absorbed as if carried off by the moſt complete drainage for that purpose; by this means the Bogs were in a great measure prepared to receive the waters, and by retaining them no longer than was necessary to promote vegetation, they produced the sudden spring of grass already mentioned.

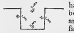
It is with pleasure I have here to observe the praise-worthy experiments made by Lord Ross, according to Mr. Richardson's plan for cultivating the Bogs of Ireland. The portions of Bog allotted to these experiments are an acre on the Red Bog of Ballywilliams, near Parsonstown, 27 feet deep, and an acre of the Bog of Clonbrone, of the same nature. The firſt of these experiments was prepared by levelling the Bog, and sprinkling it with a compoſt of lime and clay, and the grass was planted in October laſt. I went through it frequently in June, and saw the grass planting in many spots over the surface appearing both healthy and luxuriant; the uncommon drought of the season was much againſt its growth, but I have no doubt it will next year present a pleasing prospect of what may be done on those unprofitable tracts, and prove to the proprietors the possibility of increasing their own eſtates on much easier terms than by purchasing the fee simple of others.

In treating of improvements upon such extensive tracts of plain surface, I conceive it to be of the higheſt importance to take into consideration the moſt efficient way of providing ſhelter, as it muſt be admitted that cold and chilling blaſts, passing uninterrupted for a diſtance of three or four miles, or even less, muſt check vegetation, and be prejudicial to cattle, particularly young ſtock; which description it is moſt probable the improved grassy Bogs would be beſt adapted for, until their surface ſhould become consolidated and interwoven with vegetation. To obtain this desirable acquisition I would propose to intersect the Bogs with belts of ſkreen planting, in such proportions as local circumſtances might render necessary, always keeping in view to break the effects of the prevalent weſterly winds. The object of ſhelter would not only thereby be attained in a few years, but also a profitable growth of Timber of considerable magnitude, which would contribute to repay the expense of Drainage, &c.

I have found the Bogs (with few exceptions) to be in a similar ſtate of wetness. The sources from whence they are fed I ſhall particularize in my detailed Reports; they generally are from 20 to 40 feet deep, and the under ſtrata are every where chequered with blue clay, gravel, and sand. Marl, in some inſtances, is found; but the general depths of the Bogs are such as to render the under ſtrata of little or no importance in point of manures, as the expense of raising them would more than counterbalance the prospect of future expectation.

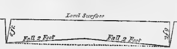
In the course of my Survey I have met with many spots of the Bogs perfectly dry and fit for immediate agricultural improvement, and some places where crops might be produced with little labour, and a prospect of a good return. My surprize was naturally excited on beholding such temptations held out by Nature, and that to a people apparently induſtrious. I of course enquired into the cause of such apparent and palpable neglect to their own intereſt, but was soon perfectly satisfied, that the want of title, and the dread of being obliged to pay for their own improvements, was a sufficient reason why those Bogs passed from father to son in the same ſtate of nature in which they had been found many ages paſt. Thus the want of title, and the fear of accumulating rent, prevents the smalleſt spirit for improvement; whereas, if even a small portion of those uncultivated tracts were leased at a reasonable value, the spirit of emulation would inſtantly manifeſt itself amongſt the tenantry: the landlord would receive rent for what now remains almoſt useless to the tenant, and a blank in his rent-roll, and the tenants would then chearfully improve and convert unprofitable Bogs to useful and agricultural purposes.

On the subject of Drains in general, various are the opinions likely to be given by the number of persons who have now that subject under consideration; for my own part, I have made up my mind and drawn my conclusion, from the Drainage already effected on different parts of the Diſtrict committed to my charge, and upon the exiſting circumſtances of the undrained tracts, which are particularly given in my detailed Reports. My Main Drains in general are laid out with from 10 to 15 feet sinking; the surface Drains which I have met with are four or five feet deep, six feet wide at top, and one foot at bottom. I would however recommend perpendicular surface Drains four feet wide and four feet deep, thus. My reason for recommending this description of Drain, is, that I have found them to ſtand remarkably well, even where they have been seven feet deep and but four feet wide, and which may be viewed any day in the Red Bog of Lettybrook. These descriptions of surface Drains are easily passed over, and they are not liable to be choaked up by sods thrown in by every passenger who thinks proper to make ſhort cuts across those tracts. There is also another advantage in the four-feet Drains, namely, that Bog bridges formed on them are likely to ſtand much longer than if they were across a ſix-foot Drain. These bridges I find to answer all the purposes of communication; and they are adopted in many places, particularly in Mr. Berry's Bog improvements at Clooneen and Galros. They are formed in the progress of making the Drains, by leaving five or six feet of the Drain uncut at proper places, through which a passage for the water is perforated, and the surface gravelled. I would therefore recommend the general adoption of those bridges on all the surface Drains, at a diſtance of not more than 15 or 20 perches asunder, besides one at the junction of every surface Drain with its main-carrier. This great and necessary accommodation can be done without any additional expense in making the Drains.



It may seem ſtrange to a person unacquainted with the facts, that perpendicular or walled Drains ſhould be recommended, under an impression that the soft quagmire of which moſt of the Bogs are composed would collapse or close together; the fact is quite the contrary, for the sides (being perpendicular) will not retain or catch the waters falling on the surface, but will in consequence harden and become in fact a Bog wall, supported and kept together by its unbroken fibres and ties from top to bottom; whereas sloped Drains, by exposing to the weather all their broken sides, are kept continually in nearly their original ſtate of wetness. However, it would not be safe to recommend this syſtem for the larger description of main and tap Drains, as in the event of man or beaſt falling into them, it would be almoſt impossible to save themselves from periſhing.

The surface Drains marked on the Map are laid out generally to form acute angles with the main Drains, so as to embrace the greateſt fall of the natural declination, by running obliquely along the inclined plane. Where no advantage can be had by this means, and where the whole surface forms a dead level, an artificial fall muſt be ſubſtituted—thus



On the important subject of Manures, and the practicability of raising them from the under ſtrata, or conveying them from the periphery into the interior of those immense tracts of Bog, much might be said; I ſhall however confine myself to briefly ſtating what I conceive to be the moſt probable and effectual method of carrying into execution that moſt desirable object.

The different Lines of Drainage which I have the honour to submit for your consideration, will, I truſt, be sufficient to reduce the surface to a ſtate of consolidation; but we muſt not ſtop there; spontaneous vegetation cannot possibly find its way into those dreary waſtes for ages, and therefore the aid of manures is indispensably necessary. In the Black Bog and Moors, the loss of compoſt or manuring gravels is not so severely felt, that description producing ſtrong aſhes, by which the landholders are enabled to propagate profitable crops of rape and potatoes, &c. But as this species of manure is unattainable in the ſhaking Red Bogs, methods muſt be devised either to raise the under ſtrata to the surface, or to convey from the exterior such gravels or manures as the surrounding country affords. This laſt resource, with a few exceptions, is in my opinion the moſt practicable, and even this cannot be carried into effect without great labour and expense. However, the magnitude of the undertaking, and the benefits likely to result from it, have induced me to take advantage of the natural capability of the country in affording means of conveying manuring gravels to the interior of the Bogs by the aid of navigable cuts, and therefore wherever gravel may be had with a supply of water to command the summit of a Bog, I have, in laying out my Main Drains, kept in view the further object of converting them into future lines of navigation for Bog purpoſes only; when I say for Bog purpoſes only, it is neceſsary to obſerve, that thoſe propoſed Cuts, being formed on different and promiſcuous levels (depending on the supply of water and gravel) they cannot be converted into any general line of Canal for purpoſes of trade (the want of which is already supplied in this Diſtrict by the preſent line of the Grand Canal from Tullamore to the Shannon) and therefore they are propoſed to be only such as would be capable of paſsing manure and gravel boats of from 15 to 20 tons burthen, in conſequence of which they need not be finiſhed on a large or expenſive scale.

The Bog ſtuff raiſed in excavating the navigable Drains could be converted to profitable purpoſes; it might be brought to the Bog edges in the boats returning for a supply of gravel, &c. and drawn from thence upon the uplands. I have ſeen the beſt crops in the country produced on light gravelly soils by this means only; and I am aſsured by gentlemen of reſpectability, that this species of manure is so valuable and certain in its effects, that it is generally uſed upon the uplands, not only bordering the Bogs, but frequently at a diſtance of half a mile and more, until the drawing of it becomes more expenſive than the return would compenſate for. The value of Bog ſtuff is further exemplified in the interior of the country, by the care with which the turf mould at the bottom of the ricks is collected and spread upon the land with a small portion of lime or clay mixed with it. This compoſt is even uſed with succeſs in rearing garden ſtuff, such as cabbages, carrots, parsnips, &c. &c. and I am convinced that if the inhabitants of the country were induced, when going for the Bog ſtuff, to bring a load of gravel with them, they might thereby have reclaimed many hundred acres round the verge of theſe Bogs, which being immediately adjoining the natural taps of the country, did not require a preparation of expenſive Drainage.

The erection of Locks in thoſe deep Bogs, is in my opinion entirely out of the queſtion. Where it is neceſsary to convey the manure from a higher to a lower level, we muſt be content with landing-places in proper situations, by means of which a load of gravel may be transferred from the boat on the high level to the boat in the low one, which in moſt caſes will not be found neceſsary, as either levels will generally commence or terminate in manuring gravels. By this means manures can be diffuſed over the surface at a comparative reaſonable expenſe, when compared with that of horſe work.

The quantity of surface which may thus be brought into cultivation will be great; for supposing that the operations of men with wheelbarrows, &c. cannot be extended more than forty perches from the verge of the Canal on both sides, yet the quantity brought into improvement will be 160 Iriſh plantation acres, equal to 240 Engliſh acres in every Iriſh mile of navigation; the fee of which 160 acres, at the reaſonable rate of 30 ſhillings per acre, at 5 per cent. would amount to £.4,800. On the preſumption that the effects of the navigable Drains were confined to within 40 perches on both sides, but which can never be the caſe, when it is conſidered that their influence combined with the Surface Drains muſt extend much further, by means of which the gravel can be conveyed by cattle either by back loads or on sleds drawn over the paſtures already formed, by the labour of men only. So that admitting the reclaiming of thoſe unprofitable tracts was to coſt even £.20. per acre, there would remain a profit of £.10. per acre to the improver, without taking into calculation the advantages of such improvement to the nation in general, whereby many hundred thouſand acres of theſe almoſt uſeleſs plains may be reduced to paſtures, thus enabling the Grazier to turn to tillage the uplands now occupied as feeding grounds.

The conveyance of gravel by Canal Drains, as recommended, is the only effectual way by which manures can be generally extended over the surface, the dimenſions of them are propoſed to be 14 feet at bottom, and to contain four feet water; the boats, as before mentioned, ſhould be flat-bottomed, and calculated to contain from 15 to 20 tons; they would be then eaſily removed from place to place by one or two men. A navigation of this size, where no great surge of water would be occaſioned to injure the sides, would keep in repair a conſiderable time, the advantages of which I calculate to outbalance any other mode whatſoever to facilitate the object, and save expenſe.

Roads are the only ſubſtitute that can be adopted inſtead of navigable Drains; the quantity of materials requiſite to make them is immenſe, and when accompliſhed with great labour, they would afford but an uncertain paſsage, owing to the number of deep sloughs, cuſhes, &c. &c. through which they muſt be carried. Every day they would be getting worſe and worſe, and particularly in the winter ſeaſon, when they would be moſt requiſite (labour being then eaſier obtained than in summer) and after being accompliſhed at a heavy expenſe, it would be impoſsible to keep them in repair for more than one or two ſeaſons during the progreſs of drawing gravel to the Bogs. However, their adoption in ſome situations is unavoidable, and therefore I have in many caſes opened the communication by Roads, where a supply for a navigation was unattainable, or where it could not be effected at a moderate expenſe. The navigable Drains I propoſe are quite the contrary, and I recommend their adoption, wherever practicable or prudent, as the beſt and moſt efficient mode to reclaim thoſe great maſses of Bog. It will be neceſsary to make ſome lines of Roads from the navigable Drains to the higher parts of the Bogs; where the levels could not be conveniently carried, thoſe collateral roads will not be required until the Bogs are prepared by Drainage, and the navigable lines opened; their completion can then be eaſier effected, having water carriage for the ſtones and gravel to their reſpective points of commencement.

mencement. There may be occasion for a few Bridges over the navigable Drains, which can be made of Bog timber; all other passages over the Main Drains may be reserved by only perforating the bottom and leaving the surface untouched, as already alluded to in the small Surface Drains.

On the important ſubject of Fuel, it is really ſtrange that apprehensions ſhould be entertained of its diminution in the event of Drainage, and the introduction of Agriculture on the Bogs of Ireland; for it muſt be plain to persons of the leaſt discernment, that the effect will be quite the contrary, and that the practicability of forming turf banks and getting at the beſt fuel will be increased beyond the powers of calculation; for, inſtead of being confined to the verges and periphery of the Bogs, the turf banks may then be formed (if necessary) in any part of the great flow, without danger of being inundated by the surface waters or the springs which now conſtantly prevent access to the beſt part of the turbary, and further, that the interior of the Bogs which now produce the very worſt and lighteſt kind of turf, will from the effects of the Drains be reduced to such a ſtate of consolidation, that it will in a few years afford a superior description of that necessary article. The cut-out Bogs and Moors will also be materially benefited by the proposed Drains, and the necessary taps brought up through them will also enable the turf-cutter to open again his deserted banks, which from being under water, he was forced to abandon; thus, being enabled to reach the bottom, he can (without annoyance from springs) raise his under ſtrata, and pursue his agricultural improvements with a certain hope of a competent return for his labours.

To Mill Sites I have also turned my attention, and have found some situations well calculated for that purpose, the chief of which is the Barony Stream running from Garbally and Derrymore to the River Brusna at Poullagh. This ſtream already supplies the Mill of Derrymore, after which it is joined by the ſtream issuing from Gambles Drain, and affords a conſtant and ſtrong run of water, with a fall of 33 feet from the Barony Bridge (on the road from Tullamore to Cloghan) to the tunnel under the Grand Canal at Pullough, which is sufficient for at leaſt three mills. There is also another site at the Stream of Leabeg, which though not abundant, would answer sufficiently for a rape or flax mill, having a good fall, by which a large head of water may be procured. At Lettybrook, near Cadamstown, may also be found a good site for a mill, above the point where the Lettybrook Stream is proposed to be taken to supply the navigable Drains of the adjoining Bogs. The River Clodagh, near Clonaslea, will furniſh another site, and also the ſtream at Mr. Wood's of Garbally, near Banagher. These are the principal situations that I find unoccupied with mills in this Diſtrict, besides which there are working at present no less than 23 mills of different descriptions, which are equal to almoſt any increase of tillage that may be expected from the reclaimed Bogs for many years. However, flax, hemp, and rape mills, I think will be found necessary, to which purpose it is more than probable many of the present corn mills will be converted.

In the course of my Reports I ſhall endeavour to elucidate the important ſubject committed to my charge. How far I ſhall succeed will remain for you, Gentlemen, to decide. I hope, however, to make myself underſtood in representing the general Topography of the Diſtrict, and the various circumſtances connected with and attendant on an improvement of such great national advantage; to the result of which, and as a conclusion to those general observations, I ſhall now beg leave to draw your attention. The effect of Drainage, and the aid of such manures as the surrounding country and under ſtrata afford, assiſted by the Skreen Planting I have recommended, will, I have every reason to think, produce upon the deep Red Bogs a good ſkin of grasses, particularly the Fiorin Grass, so highly recommended by Dr. Richardson.

The ſhallow Red Bogs, and the Black Bogs and Moors (of which there is a considerable quantity) would all be immediately brought into a ſtate of agriculture; the chief crops to be expected, previous to laying them down for meadow and paſtures, are Hemp, Rape, Potatoes and Oats, all of which would be produced in abundance.

I am induced again to repeat and recommend the importance and value of Skreen Plantations, as before adverted to; these Plantations ſhould form the great divisions of the Red Bogs, and be at leaſt 4 or 5 perches wide. On the ditches of the Black Bogs and Moors planting cannot be too generally adopted, for which purpose all the ditches ſhould be double, and at leaſt 10 feet wide at top, so as to admit of two rows of trees.

The description of trees which I observed to thrive beſt on Bogs are Fir, Deals, Alders, Birch, Sally, &c. &c. a good specimen of which may seen at the Earl of Charleville's, Mr. Curtis's, &c.

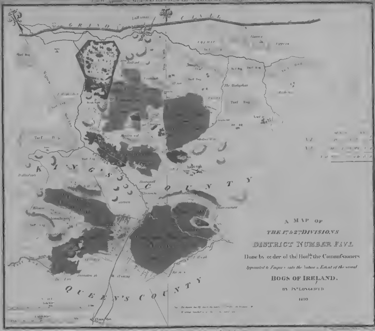
The general observations I have the honour to submit for your consideration in the foregoing ſheets, will, I truſt, be found to contain matter not unintereſting to the ſubject of enquiry. The important circumſtances attending so general and extensive an inveſtigation, opens a wide field for professional research. I have therefore moſt minutely inveſtigated the Diſtrict committed to my charge, and what I have submitted you will find to be the result of a close application to the object. I have adduced nothing but plain matter of fact, without any visionary ideas whatever; and I hope it will be found, that where I have recommended improvements not heretofore conceived practicable, they are not founded upon the origin of my own imagination, but are grounded on the more solid basis of the proved experience of others; it might be expected that I would enter generally into a discussion of the causes of those extensive tracts of Bogs, and proceed to account for their origin, as also to analyze their properties; but, Gentlemen, I muſt confess that such an enquiry appears to me quite irrelevant to the ultimate object. The plain matter of fact is, that we find those immense tracts in an unprofitable ſtate of nature, and our endeavours are directed to reclaim and improve them by the moſt efficient ways; indeed, to enter into the subject of analization would not only require considerable time and experiment, but would materially draw my attention from the more important objects of enquiry; I ſhall therefore dismiss the subject from my thoughts, and proceed to treat particularly on the present ſtate of the respective Bogs, and recommend such improvements as appear to me beſt adapted to accompliſh the great object of cultivating this portion of the Bogs of Ireland.

The advancement of agricultural benefits muſt be admitted of high importance to mankind in general; but without health to enjoy the blessings of Providence we would find ourselves miserable in the midſt of abundance. Hence we muſt not omit to keep in recollection, that independent of agricultural improvement, the draining the Bogs and Morasses of Ireland would in a material degree contribute to improve the climate, an object of no small importance to the health of the Nation.

I ſhall now conclude these preliminary observations with an Index of the order in which I have arranged the particular detail of each Bog, ſhewing at one view the quantity contained in each portion, the pages in which they are particularly treated on, and the folio in the Section-book where the falls and depths of the Bogs are accurately given, and the eſtimated expense of reducing them to a ſtate fit to receive agricultural improvement.

INDEX.

Divisions.	Folio in the Section book, where the Falls and Depths are given.	DENOMINATIONS.	Pages where treated on in this REPORT.	Contents in Statute Acres.			Eſtimated Expenses for the Drainage, &c. of each Division.		
				Acres	R.	Per.	£.	s.	d.
1ſt Division	1. and 2.	Derryadd, Derrygolan, Cloncon and Killenmore Bogs - - -	93 to 97.	3,518	1	35	5,703	2	9¼
2d D° -	3, 4, 5, and 6.	Killurin, Annaghmore, Gurteen, and Glebe Bogs - - -	98 to 103.	4,655	1	25	6,514	17	10
3d D° -	6 and 7.	Derrinboy, Caddamstown and Lettybrook Bogs - - -	104 to 107.	1,512	1	21	5,244	8	8½
4th D° -	8 and 9.	Pullough, Ballincor, Derrycooly and Derrooly Bogs - -	108 to 112.	4,980	3	38	8,185	14	5
5th D° -	9 and 10.	Coaghter, Leamore, Bunn, Derrycarney and Kincor Bogs -	113 to 115.	3,539	1	14	4,952	9	7
6th D° -	11.	Gillin, Cloghan and Lumcloon Bogs - - - - -	116 to 118.	3,069	2	14	6,842	12	11
7th D° -	12 and 13.	Lough Boura and Beanamuck Bogs	119 to 125.	8,586	3	0	18,841	3	6
8th D° -	14 and 15.	Log, Stonestown, Dunagh and Whigſboro' Bogs - - -	126 to 130.	5,055	2	0	9,799	16	6
9th D° -	16 and 17.	Coolgowny and Garbally Bogs -	131 to 135.	3,688	1	18	5,964	8	1
10th D° -	18.	Cloghil, Dowris and Galros Bogs -	136 to 139.	1,256	3	38	3,104	9	11
11th D° -	19.	Glaſter and Sheanstown Bogs -	139 to 141.	1,341	0	36	2,862	14	—
12th D° -	20 and 21.	Ballynaguilſha, Clonbealymore, Ballywilliam and Clonbrone -	142 to 146.	2,548	0	0	7,032	6	9
13th D° -	22.	Thomastown and Doughill Bogs -	146 to 148.	838	1	1	2,185	8	7
		Totals - - -	- - -	44,591	0	0	£. 87,233	13	8



A MAP OF
THE 1st & 2nd DIVISIONS
DISTRICT NUMBER FIVE
Done by order of the Honble the Commissioners
Appointed to Enquire into the Nature & Extent of the several
BOGS OF IRELAND.
BY Jno LONGFIELD
1810

FIRST DIVISION.

DERRYADD, DERRYGOLAN, CLONCON, and KILLEENMORE BOGS, containing 3,518 Acres, 35 Perches.

THIS Firſt Division of the Bogs, which I have now the honour to lay before you, is situate between Tullamore and the village of Killeagh, in the King's County, and contains of actual Red Bog 3,174 acres 3 roods and 20 perches; and of black and improved Bogs about 300 acres, together with several interspersed Islands of Clay and Gravel, amounting to about 100 acres; the chief of which Islands are Derryadd Wood and Derrygolan, the former containing 27 acres 2 roods and 5 perches, and the latter 48 acres 2 roods and 15 perches, and from which the adjoining Bogs take their names.

The Road from Tullamore to Kileagh runs through these Bogs for above a mile, leaving on the weſt side the greateſt portion, called Derryadd, Derrygolan, Ballard, and Clonminch Bogs; and on the eaſt side the great flow called Cloncon and Killeenmore Bogs. The weſt side or firſt subdivision of these Bogs is interspersed with the Gravel Hills and Black Bogs already mentioned; but the eaſt side is an extensive ſhaking Bog, unbroken by any eminence or prominent feature whatever for a space occupying 1,166 acres 1 rood, 4 perches of moſt unprofitable Bogs; the latter for sake of reference I call the Eaſt Division, and the former the Weſt Division.

I now, Gentlemen, beg leave to submit to your consideration my general Plan of these Bogs, and to recommend the adoption of such Main and Surface Drains as may beſt tend, according to my judgment, to effect the desired object, by firſt sinking to such depths as are beſt calculated for Surface Drainage, and thereby consolidating the Bogs and preparing them for future deepening where the inducements might be expected to compensate the expense. To effect the Drainage of a Bog so as to render it productive, it does not follow that it is in all cases necessary to sink to the bottom; if such a ſyſtem was adopted, the Bogs, inſtead of containing sufficient moiſture for agriculture, would become a *dry ſpônge*, such as I have often seen along the high banks of the Shannon, which being opened and split by the heat of the sun would be almoſt as little inclined to promote vegetation as in their original ſtate of wetness. I ſhall, therefore, with caution recommend expensive deep sinking, except where I find the moſt salutary effects would be produced. However, where it is possible, I have laid out my Main Drains so as to admit of deep sinking at any future period, ſhould such a measure be found expedient.

The direction of the proposed Main Drains you will find marked with ſtrong red dots on the Map: and the light dotted lines ſhew the Surface Drains, falling in general with the natural declination of the Bog. The red figures marked on the Map and Sections ſhew the number of feet the several points are above the key-ſtone of Macartney aqueduct near Gillen, and the black figures, which are only to be found in Glaſter Bog, ſhew the number of feet fall from said key-ſtone, which point *of data* is 124 feet below the summit level of the Grand Canal. By comparing those figures, and subtracting the lesser from the greater, the natural fall of each line of drain proposed may be ascertained; for example, the figures 72, at the Glaſh Bridge (near Lord Charleville's demesne) being taken from the figures 138, at Killeagh Wells, ſhew the fall from said wells to the Glaſh Bridge to be 66 feet; and by deducting 72 feet from 124, you find the Glaſh Bridge is 52 feet below the summit level of the Grand Canal; by which means the levels of the several diſtricts connected with the Grand Canal may be compared with accuracy.

The extent of Red Bog now under consideration is in general extremely wet, full of quagmires, and in an unprofitable ſtate of nature. The lands immediately adjoining them are generally low, except one prominent feature called *Scrub Hill*. This eminence I find pregnant with considerable springs, which having a free passage into these Bogs, particularly the eaſt diviſion, are the cause of their very wet ſtate; therefore, on the subject of Main Drains, I think it proper to observe, that the firſt ſtep to be taken ſhould be a deep Catchwater Drain to cut of those springs; which being effected, the operation of working at the remaining Main Drains would be less interrupted by the supply of water at present flowing into this division of the Bog. This Catchwater Drain you will find marked on the Map, and referring to Section No. 7; which points out, that at a diſtance of about 200 perches the springs of Killeagh are sufficiently high to afford the object of irrigation to the whole of this portion of the Bog.

The natural tap of the weſt division of these Bogs is a ſtream called the Glaſh. This ſtream, rising at Derrybeg, runs near a mile through the Bogs, forming a low cuſh or vale, till it passes under the Glaſh Bridge into Lord Charleville's demesne, where it is the chief supply to his Lordſhip's lake, and to the caſtle for common purposes. The numerous Drains made by Mr. Sadlier in his extensive Bog improvements, empty themselves into this ſtream, being the only ventage from his Bogs, which now present a moſt grateful return for his labour; clearly proving by practice what can be effected on these extensive and unprofitable tracts. This, as well as other circumſtances, has induced me to fix upon the Glaſh Bridge (at Charleville Foreſt) and at letter A on the Map and Section, as the main ventage or outlet for the waters issuing from the Drains, proposed to improve this Weſt Division of the Bogs.

The bottom of this bridge is 20 feet 6 inches above the surface water of the 27th level of the Grand Canal at Tullamore; it is also 72 feet above the key-ſtone of Macartney aqueduct near Gillan, as already mentioned. This pass is also sufficiently low to drain the Bog on the eaſt side of the road; but as there are two good taps on the verge of said Bog at Killeenmore, I have chosen them for the ventage of that Bog.

The firſt operation I would recommend for the benefit of the Weſt Division is, to open a Main Drain in a direct line from the Glaſh Bridge to the end of Mr. Sadlier's Drain at C, to be three feet wide at bottom, and to batter on each side six inches to each foot. The sinking at C to be 12 feet, and 15 feet wide, with a fall of 4 feet to the bridge in a diſtance of 260 perches; then continuing said Drain from C to D and E in the direction of the present Drain, sinking 8 feet 6 inches at the point E; from which point I propose turning into the high Red Bog of Derryadd at F, and then towards Killeagh, ending at the point G. This Drain will have a fall from G to A of 42 feet in a diſtance of about 900 perches; at which point G the whole of the Killeagh ſtream may, if necessary, be taken in for irrigation. It will also take up the springs at the weſt side of Scrub Hill, at the point E; by communicating with the present Drain, by being scoured and sunk, will effectually cut off the springs issuing from the lands, and conduct their waters by said proposed Drain to the Glaſh Bridge.

I next propose a Tap Drain, 3 feet wide at bottom, from the point B in the Glaſh by H and I, through Derrygolan Bog, until it joins a Main Drain made by Mr. Curtis. (See Section No. 2.) And I also recommend five communicating eight feet Drains in said Bog, two running from said Main No. 2, towards Derrygolan, two towards O'Hara's Hill, and one falling into Mr. Curtis's Main Drain near Clonad. I also recommend the present Drains from the Barony Bridge and Dunne's Bridge to be deepened and widened the whole way to their junction near the point C.

In Ballard and Clonminch Bog I have only to propose the Surface Drains, as marked on the Map, the waters of which will chiefly fall into the Glaſh Drain No. 1; the remainder of the waters falling towards Clonminch plantations, and into Martin's Drain, &c. &c. The proposed Main Drain, No. 1, being carried through Derryadd Bog, as before mentioned, I propose a Drain, forming a junction with it, running from the point F to Q, between the islands of Derryadd and Derrybrauagh. (See line of Section No. 3.) This I suppose to be a saddle Drain, falling from the centre at the point of Derryadd Wood both ways to F and Q. The average sinking of this Drain will be about 10 feet, which with the Surface Drains and the Main Drain from E to G, together with deepening and widening the land Drains round Hawk's Wood, will, I truſt be sufficient to effect the Drainage of the whole of the Weſtern Division.

Nothing can be worse than the present ſtate of the Bog eaſt of the Killeagh Road, although its summit is near 48 feet above the Glaſh Bridge. It is, however, to the springs of Scrub Hill that all its wetness is to be attributed. These springs completely command the summit of the Bog (as I have already observed) and may be said to be continually saturating the whole surface of it, so much so, that its centre being a dead level, is literally a ſhaking quagmire, with floating islands of heath. I have levelled round this Bog, and find the tap I have chosen is near 30 feet below its summit in a diſtance of little more than a mile. From this point of Ventage at M on the Map, and on the Section No. 5, I propose to run a Main Drain through the centre of the Bog towards Cleary's Bridge at O, on the Killeagh Road, with two cross mains falling into it at N and R, and running towards the summit at the points P and S under Scrub Hill, together with the Catchwater Drain to intercept the springs before alluded to. This catchwater Drain I propose to fall into Grogan's Mill Pond; and ſhould it be found necessary, it can at any time be ponded up, and the whole surface of the Bog irrigated. On the verge of this Bog at Cloncon, I would also propose a receiving Drain from Cloncon Bridge round by Murphy's Stream, and to the main outlet at Killeenmore. (See Section, No. 8.)

With respect to manures to be found in these Bogs, I find by boring for the Catchwater Drain under Scrub Hill, and for some other of the Main Drains, that there is good limeſtone-gravel and marle, chequered with ſtrata of fine ſtiff blue clay, which is very prevalent, and which I am inclined to think would answer well for potters use, being entirely free from sand or gravel. This clay, in some places, is called Laghlea, and I am informed it produces abundant crops of hay, but I have not seen any of it tried; indeed the usual depths at which I have found it being from 20 to 30 feet under the surface of the Bog, are such as to preclude its introduction to the surface. However, a better prospect is opened for the introduction of agriculture upon those tracts, from the several Islands or Derrys favourably interspersed throughout Derrygoland and Derryadd portions. These islands abound with great plenty of limeſtone and manuring gravels, which being on the surface, renders their aid more efficacious than under ſtrata of a similar nature; and they may be spread on the surface of the Bogs at a much less expense, and more expeditiously, than if they were raised from the bottom of any Main Drain. To facilitate this great object, I have laid out a proposed line of new Road across the Bog through Derrybeg and Derrygolan, and to continue along the present Bog Road to Clonad, where it forms a junction with the high

Road from Tullamore to Caddamstown: from this propoſed Road I have alſo laid out a croſs Branch to O'Hara's Hill, by which means the Bog will be completely interſected, and the manuring gravel can be conveyed along ſaid Road to the interior. Independent of theſe advantages, this line of Road will be found extremely uſeful in opening the country, and bringing to market the produce of Derrybeg, Derrygolan, and Hawkswood, a tract of country now occupying not leſs than 400 acres of arable land, which at preſent is completely ſhut out from any communication with the high Road, except by ſuch Bog Roads as are almoſt impaſſable in winter time.

About 250 Iriſh.

On the ſubject of improvements already effected, I have particularly to obſerve the Black and Red Bogs held by Mr. Sadlier under Lord Digby, containing about 343 acres. Theſe Bogs being moſt judiciouſly interſected with main and croſs Drains (on a ſmall ſcale) are now for the moſt part in a perfect and profitable ſtate of agriculture, ſo much ſo, that a great portion of them which when taken by him were not worth 5*s.* per acre, would now produce from 30 to 40 ſhillings the Iriſh acre. The progreſs of improvement conſiſted chiefly in draining, levelling, and burning, by which means he has been enabled to rear abundant crops of rape, on an average from ſeven to ten barrels per acre, which, at the moderate rate of one guinea and a half per barrel, muſt have amply repaid his expenſes, independent of creating a valuable and laſting property which he now enjoys.

About 212 Iriſh.

The proprietors of theſe tracts of Bogs are, the Earls of Charleville and Digby. Lord Charleville's part is, however, not more than about one ſixth of the whole, being confined to the portion which belongs to Clonmineh and Ballard; the remaining five-ſixths belong to Lord Digby, and are in the Barony of Geaſhil.

PLANTATIONS.

Much of this ornamental and profitable ſpecies of improvement has been effected on the borders of theſe Bogs, and in the Iſlands and Derrys interſperſed through them, ſome of which are of ancient ſtanding, ſuch as Clonad, Derryadd, Derrybranagh, and Derrygolan Woods. There are however many late plantations, particularly on Lord Charleville's part, which are in a thriving ſtate, both on the verge and in the deep Red Bog, near the Glaſh Bridge. This part, which I am certain was not leſs than from ten to fifteen deep when the improvements were commenced about 18 or 20 years ago, is now covered with trees of different deſcriptions, chiefly fir deals, many of which would ſquare from ſix to nine inches; and his Lordſhip (for whoſe kind communication and attention I am much indebted) aſſured me they were planted in the actual Red Bog, without any compoſt or earth-balls which might be preſumed neceſſary for Bog plantations.

There is another circumſtance which I obſerved in this place, which muſt remove any remaining doubt touching the practicability of being able to cover a great part of thoſe uſeleſs tracts with profitable plantations, which is, that the trees I have juſt mentioned, planted by Lord Charleville, are actually growing within a few feet of the depth of the ancient timber produced by the ſame Bog, and which is now ſeveral feet under the preſent ſurface; the ſtumps and roots, however, may be ſeen in the ſide of the plantation ditch, and many of them were neceſſarily cut away and raiſed in making the Drains on each ſide of the Road where the roots appear conſiderably above the under ſtrata, which proves that this ancient timber muſt have grown on a ſtratum of the Bog without receiving any nouriſhment from the clay and gravel. It may be ſaid, in refutation of this fact, that this ancient timber was in a growing ſtate long before the Bog moſs began to vegetate, and that in conſequence of the falling leaves and trunks producing ſtagnant waters, the Bogs were firſt formed. That this hiſtory of the origin and growth of Bogs may in ſome caſes be admitted, I will not attempt to deny; nor do I feel it my duty (even were I competent) as I have before obſerved, to enter into a digreſſion on the cauſes or origin of thoſe unprofitable Bogs, which it is now hoped may be reduced to a ſtate of agriculture. However, in this particular caſe, the aſſertion muſt give way, when it is proved by the roots and branches themſelves that they muſt have flouriſhed in this Bog ſeveral feet above the under ſtrata, and at this moment they may be found reſting where it is evident they were burned down to the root midway between the preſent ſurface and the bottom of the Bog; and from the poſition of the roots being erect, it is obvious the woods muſt have been burnt while ſtanding, and that the fire was extinguiſhed as it approached the roots and wet moraſs, otherwiſe they muſt have inevitably been deſtroyed root and branch.

At the cloſe of theſe obſervations, I beg leave to ſubmit to your conſideration my Eſtimate of the Expenſe attending the completion of the Drains, Roads, and Bridges, which in my opinion will be found neceſſary to reduce thoſe Bogs to a ſtate fit to receive agricultural improvements, which, as well as all my other Eſtimates, I have formed according to the general value of labour in the King's County, and according to the prices uſually paid for ſimilar excavations, particularly the works done for the Grand Canal Company in ſome of the Bogs, on which I have now the honour to report. On the whole I have endeavoured, as far as in my power, to come as near the truth as the nature of the ſubject would permit; and I truſt that with my additional allowance for incidents, the Eſtimates will be found to cover the whole expenſe of laying out and executing the propoſed works.

ESTIMATE of EXPENSES necessary to execute the proposed Works on the Bogs of DERRYADD, DERRYGOLAN, CLONCON and KILLEENMORE, &c. &c.

No. of Section					
	feet.	s	£.	s.	d.
1.	To 161 perches of Main Drain, average 7 sinking - - at	6/	48	6	—
	To 48 perches - D° - - - - 9 d° - - - -	11/	26	8	—
	To 24 perches - D° - - - - 7 d° - - - -	6/	7	4	—
	To 208 perches - D° - - - - 11 d° - - - -	18/2	188	18	8
	To 120 perches - D° - - - - 8 d° - - - -	7/3	43	10	—
	To 68 perches - D° - - - - 12 d° - - - -	24/6	83	6	—
	To 40 perches - D° - - - - 15 d° - - - -	40/10	81	13	4
	To 40 perches - D° - - - - 13 d° - - - -	28/	56	—	—
	To 40 perches - D° - - - - 10 d° - - - -	15/7	31	3	4
	To 24 perches - D° - - - - 13 d° - - - -	28/	33	12	—
	To 40 perches - D° - - - - 15 d° - - - -	40/10	81	13	4
	To 34 perches - D° - - - - 13 d° - - - -	28/	47	12	—
2.	To 52 perches of Main Drain from the Glash through Derrygolan Bog - - - - - - - average 11 feet sinking - -	18/2	47	4	8
	To 112 perches - D° - - - - 13 d° - - - -	28/	156	16	—
	To 32 perches - D° - - - - 12 d° - - - -	24/6	39	4	—
	To 32 perches - D° - - - - 9 d° - - - -	11/	17	12	—
	To 12 perches - D° - - - - 6 d° - - - -	3/6	2	2	—
3.	To 60 perches of Main Drain, from F, Section No. 1, through the Red Bog between Derryadd and Derrybranagh, average 14 feet sinking - - - - - - - - - -	32/	96	—	—
	To 40 perches of D°, average 11 feet sinking - - - -	18/2	36	6	8
	To 108 perches of Main Drain, average 9 feet sinking - -	11/	64	8	—
	To five communicating 8-feet Drains, connected with Main Drain No. 2; the whole 440 perches - - - - - -	7/3	159	10	—
	To scouring and deepening 320 perches of present Drains, between Derrygolan and Derrybegg - - - - - - -	1/	16	—	—
	To deepening and widening the Bar^y^ Bounds, from the Killeagh Road to the Main Drain No. 1, so as to leave it a clear Drain eight feet deep, 150 perches - - - - - -	5/	37	10	—
	To scouring all the present Drains about Derrybeg, and from the Bar^y^ Bounds to Dunn's Bridge, the whole 210 perches - -	1/	10	10	—
	To scouring and deepening about 2,000 perches of present Drains from Derrybeg to Derryadd, and about Hawkswood - -	1/	100	—	—
	To 4,200 perches of Surface Drains, for the Bogs west of Killeagh Road - - - - - - - - - -	2/6	525	—	—
	To 480 perches of proposed Road 14 feet gravel, through Derrybeg, Derrygolan, and into the Road from Tullamore to Clonad Wood	10/	240	—	—
	To 740 perches of Parallel Drains to D° - - - - -	2/6	92	10	—
	To a large wooden Bridge where the Road is proposed to pass over Main Drain No. 1. - - - - - - - - - -	- -	30	—	—
	To 220 perches of Cross Road, from Derrygolan to O'Hara's Hill	10/	110	—	—
	To 220 perches of Parallel Drain to D° - - - - -	2/6	27	10	—
	To a large wooden Bridge where the Road is to pass over Main Drain No. 2. - - - - - - - - - -	- -	40	—	—
	To eight small Pipes under those two proposed lines of new Road - - - - - - - - - -	£.5/	40	—	—
	Total Expense of proposed Drains, recommended for the Bog west of the Road - - -	- £.	2,617	10	—

Eſtimate of Expenses, &c.—*continued.*

No. of Section.	———				
	EAST DIVISION.	*s.*	*£.*	*s.*	*d.*
4.	To 16 perches of Main Drain from Clareys Bridge, across the Red Bog to Killeenmore, average 7 feet sinking - - -	5/	4	—	—
	To 152 perches of Main Drain, average 12 feet sinking - -	24/6	186	—	—
	To 156 perches - D° - - - - 10 - d° - - -	15/7	121	11	—
	To 23 perches - D° - - - - 6 - d° - - -	3/6	4	—	—
5.	To 120 perches of Main Drain, from No. 4. towards Scrub Hill, average 12 feet sinking - -	24/6	147	—	—
	To 160 perches - D° - - average 11 feet sinking - -	18/2	145	6	8
	To 20 perches - D° - - - - 8 - d° - - -	7/3	7	5	—
6.	To 80 perches of Catchwater Drain, commencing at Grogan's Mill Pond and carried to the summit of the bog at Scrub Hill, average 4 feet sinking in Clay and Gravel - - - -	3/6	14	—	—
	To 184 perches of D°, average 9 feet sinking - - - -	11/	101	4	—
	To 70 perches - D° - - 11 - d° - - - - - -	18/2	63	11	8
	To 90 perches - D° - - 10 - d° - - - - - -	15/7	70	2	6
	To 12 perches - D° - - 5 - d° - - - - - -	3/	1	16	—
7.	To 406 perches of Main Receiving Drains along the Bog edge, from Cloncon Bridge to the outlet ſtream at Killeenmore, 3 feet at bottom, average 6 feet sinking - - - - - -	3/6	71	—	—
	To a central 8-feet Receiving Drain, communicating with and falling into Main No. 4. near Killeenmore 250 perches - -	7/3	90	12	6
	To a 6-feet Receiving Drain at Killeenmore, 130 perches - -	3/6	22	15	—
	To 347 perches of proposed Road along Main Drain No. 4. -	15/	260	5	—
	To 250 perches of proposed Road along the central Receiving Drain, communicating with, and falling into Main No. 4. near Killeenmore - - - - - - - - -	15/	187	10	—
	To 597 perches of Road Drain - - - - - -	2/6	74	12	6
	To 4,500 perches of Surface Drains - - - - - -	2/6	562	10	—
	TOTAL EXPENSE of proposed Drains:				
	On the Eaſt Division - - - - - - -	- £.	2,135	2	4
	Amount of Weſt Division - - - - - -	- -	2,617	10	—
		£	4,752	12	4
	Contingent and unforeseen Expenses, £. 20. per Cent. -	- -	950	10	5½
	GROSS TOTAL of 1ſt Division - - -	- £.	5,703	2	9½

SECOND

SECOND DIVISION.

KILLURIN, ANNAGHMORE, GURTEEN, and GLEBE BOGS, in the King's County; together with BOGADERRY and CLONAGHBEG BOGS adjoining the same in the Queen's County, and lying on the weſt of the River Clodagh: also the BOGS of CLONAGH, RERYMORE, and CUSH, in the Queen's County; and BALLINVALLY and DERRYGUNNIGAN in the King's County, which are on the eaſt side of the said River Clodagh:

2,874 Iriſh. The whole containing 4,655 acres 1 rood and 25 perches.

1,201 Iriſh. 703 Iriſh. 410 Iriſh. THE Weſt Division of these Bogs, containing 1,945 acres 1 rood and 27 perches, is situated between Tullamore and Clonaslea. The four firſt denominations of them, namely, Killurin, Annaghmore, Gurteen, and Glebe Bogs, containing 1,138 acres 2 roods and 38 perches, are in the King's County; 664 acres and 21 perches of which forms a mass of deep Red Bog, between the Hill of Killurin and the high lands of Annaghmore, the depth of which towards the summit is from 30 to 37 feet in ſhaking quagmire full of springs, (as may appear by Section No. 14.) It is not however to the want of sufficient fall that the present ſtate of wetness in this Bog is to be attributed; on the contrary, it possesses every capability for efficient drainage, having a fall from its centre each way; firſt to the Scunce of Killurin on the weſt, of 41 feet in about an Engliſh mile, and secondly, to the County Drain (which falls into the River Clodagh) with a fall of 32 feet along the present boundary Drain between Lord Digby and Mr. Curtis. This Drain (the fall of which is represented in No. 14) commences at the county bounds, and is carried up by Mr. Curtis as a Tap Drain, by which he has been enabled to lower Lough Annagh at leaſt three feet. From this tap the boundary Drain between Mr. Curtis and Lord Digby is carried towards Gurteen Bog, and from thence in a central direction through said Bog of Killurin and Annaghmore, emptying itself partly to the eaſt and partly to the weſt, as before observed. However, the insufficiency of a single Drain in the centre of a deep ſhaking Bog 120 perches wide, and full of springs, is here exemplified; for although the Drain, which is made but a few years, was originally about 8 feet wide and 4 feet deep, it is now almoſt entirely choaked up, and the summit of the Bog appears nearly in its original ſtate of wetness and ſhaking quagmire, notwithſtanding the conſtant run of water issuing from said boundary Drain, and which muſt evidently be fed by a never failing source, from the circumſtance of a spring well being actually in the side of the Drain on the summit, which, when viewed by me, did not appear to be affected by the uncommon drought of the season. It is indeed difficult to ascertain from whence this head of water in so high a Bog is fed; but I am, from the minuteſt examination, of opinion it proceeds from the lands of Annaghmore, which, although not so high or commanding as Killurin Hill, evidently contain abundant internal springs, which may be well ascertained from the conſtant ſtreams issuing from the north and eaſt sides of the lands, partly running to the Scunce of Killurin and partly into the County Bounds and the Clodagh River. With respect to Killurin Hill, although it is by much the higheſt, there is no such appearance of water along its base, nor is there any ſtream running from it in summer time; on the contrary, it is composed of a porous limeſtone quarry, which actually absorbs the summer surface water by a small gully-hole; but as this muſt be an uncertain channel for winter waters, I have deemed it necessary to recommend a small Receiving Drain at the foot of the hill verging the Bog (see Section No. 16) to carry off the surface water in wet seasons; which, falling into the old Land Drain of Gurteen, is carried down to the Clodagh. Being therefore perfectly satisfied from whence the source of water proceeds, and being desirous of cutting off its communication with the Bog, I have judged it expedient to recommend the Drain made by Mr. Curtis, between his Bog plantation and the land, to be sunk six feet below its present bottom; which, I truſt, will be sufficient to intercept the springs alluded to. This Drain at present has an abundant fall of not less than 40 feet to the Scunce of Killurin, which affords ample capability of further sinking should it be hereafter found necessary.

92½ Iriſh. Among the improvements actually effected, I have to mention particularly the endeavours of Mr. Curtis, in reducing to a ſtate of consolidation a large portion of Red and Black Bogs, little less than 150 acres; a great part of which has been brought into cultivation within the laſt fifteen years, and which at this moment are actually under ſheep, and the remainder ready to receive any agricultural improvement. Certainly a good quantity of what was thus brought in is composed of Black Bog and Moor, producing ſtrong aſhes; by which he was enabled to rear valuable crops of rape, and along the ſkirts of which he has a line of ſkreen plantation, which now appears both healthy and vigorous.

When the Catchwater Drain before-mentioned ſhall have operated as such, and the supply be cut off from the interior of the Bog, I propose sinking the centre boundary Drain between Lord Digby and Mr. Curtis, to the depth as described in Section No. 14; which will considerably lower the surface on both sides, and create a draw for the waters of the Surface Drains, which I have proposed to communicate by acute angles with the Main Drain, in order to obtain the greateſt fall by running obliquely down the natural declivity of the Bog, and which are particularly delineated on the Map.

GURTEEN BOG, which is connected with and joining the foregoing Bogs of Killurin and Annaghmore, contains 430 acres 3 roods and 20 perches of Red Bog and 266 Iriſh Acres. improveable Black Bog and Moors. This tract of Bog and Moors is poſſeſſed of great capability for improvement; and indeed it is really aſtoniſhing that advantage has not been taken of it by the tenantry of the adjoining lands of Gurteen. The falls on all sides are great. A considerable portion of the Bog is black and moory, producing good aſhes when burnt; and even the Red Bog is interspersed with many spots where gravel can be had within from *two* to *six* feet of the surface, and yet little or nothing has been done to reduce it to a ſtate of cultivation. I muſt own it surprized me much, but on enquiry I was perfectly satisfied, by being answered the tenure is bad, but a few years of the lease to come, *and no encouragement to improve.* If we labour the Bog (says the tenant) it is only to increase the landlord's rent roll; for no sooner are the unprofitable waſtes brought into cultivation, but the Surveyor appears to measure the improvement, which is immediately added to the former rent.

This ſyſtem, the great bar to all Bog improvements, never fails to operate forcibly, for such is the dread of increased rent, that the generality of middling Farmers would rather forego the chance of making £. 5. than incur five ſhillings in the annual rent.

This portion, called Gurteen Bog, is entirely surrounded by present and proposed Main Drains, and therefore I have only to recommend a centre line of that description. (See Section No. 15.) which will not only effect the Drainage, but will afford an opportunity of raising abundance of gravel, through which it is proposed to be sunk 5 or 6 feet; this Drain, with the proposed Surface Drains as marked on the Map, will be sufficient to prepare this portion for agricultural improvement.

BOG of CLONAGHBEG, in the Queen's County.—This Bog adjoins the foregoing Bog of Gurteen, from which it is only divided by the new County Drain running from Lough Annagh to the River Clodagh. It contains 562 acres and 13 perches of Red and Black 347 Iriſh. Bog; in this is included a considerable tract exceeding 150 acres of improvable Black Bog and Moors, a part of which, adjoining the road to Clonaslea, has been partially improved. It is a remarkable circumſtance, that this tract of low Black grazing Bog is much deeper than the high Red Bog between it and Lough Annagh (as appears by Sections 16, 17, and 18) the former being in many places 18 and 20 feet deep, while the latter is only from 11 to 14 feet deep. The fall of this, as well as Gurteen Bog, is to the river Clodagh, into which the three lines of Main Drains No. 9, 10, and 11, will empty themselves through the County bounds. Into the firſt of these proposed (No. 9.) it is intended to turn the present irregular Mountain Stream, that now makes its way in different directions through those Bogs and Moors, which Drain will have a fall of 10 feet in 226 perches. The second Drain No. 10, is proposed to run parallel to No. 9, at a diſtance of about 65 perches, and will have a fall of 12 feet in the same diſtance. These Drains are not intended to be above 7 feet deep and 3 feet at bottom. The third, No. 11, is proposed to be of similar depth, running through the Red Bog, and communicating with No. 10, having a fall of 12 feet in 190 perches. I also recommend widening and deepening the Drain between Clonaghbeg and the cut-out Bog adjoining, which, with the Surface Drains marked on the Map, are all that I find necessary to recommend in this Bog by way of Drainage.

BOGADERRY BOG is nearly adjoining the laſt-mentioned Bog of Clonaghbeg, and is situate on the weſt side of Lough Annagh; it contains 244 acres 2 roods and 15 perches, 151 Iriſh. of firm Red Bog, chiefly the eſtate of Lord Montrath; its chief ventage is into Lough Annagh, and also into a ſtream at the Derrys, into which the lines of Main and Surface Drains are proposed to discharge. The firſt, as described in part of No. 12, commences at Lough Annagh, and is carried along the County bounds adjoining the Glebe Bog, and from thence along an old drain towards Bogaderry, falling into the ſtream before alluded to. The second is represented in Section No. 13, is proposed as a main receiver under the lands of Bogaderry, which, with the communicating Surface Drains, will be sufficient to render it accessible in all seasons. There are two high hills of excellent gravel at the Bog edge, adjoining the Derrys, which are moſt conveniently situated for diffusing their aid over the surface of the Bog. There is also another small island, by the verge of which the Main Drain, No. 13, is proposed to run, and which will afford a quantity of gravel in its vicinity.

LOUGH ANNAGH, which is immediately connected with this and the adjoining Bogs, contains 207 acres 1 rood and 14 perches, the greater part of which is very ſhallow, having 128 Iriſh. in general but from 5 to 8 feet water in summer, which from its. situation being on the summit of Clonaghbeg Bog (as appears by Section No. 12) may at any time be drawn off, by sinking the County bounds to the River Clodagh or the present Tap Drain made by Mr. Curtis, either of which have a fall of 21 feet from the Lake to the County Bridge at Cuſh. Having taken a number of soundings in Lough Annagh, I had an opportunity of viewing the bottom of it in many places, which I observed is chiefly composed of Bog Banks, interspersed with innumerable roots of trees, with a ſhoal of gravel and ſtones in its centre, which are visible in summer time. Should it be advisable at a future period to draw off the water of this Lake, I would recommend a Sluice to be erected at the junction of the Tap

Drain, by which a head of water may be preserved in dry seasons for irrigating the greateſt portion of the Bogs of Clonaghbeg and Gurteen.

27 Iriſh. The GLEBE BOG adjoining the foregoing Bog of Bogaderry, is in the King's County, and contains 43 acres 2 roods and 38 perches, of firm Red Bog; it is bounded by the County Drain and Bogaderry Bog on the south, and by Lough Annagh on the eaſt, into which its surface waters for the moſt part are carried. It is at present surrounded by Tap Drains on the north, south, and weſt, and by Lough Annagh on the eaſt, together with a Centre Drain. In addition to which I have only to propose three Cross Drains from eaſt to weſt, which, with scouring those already made, I am of opinion will effectually carry off the surface waters.

On the subject of Manures in and adjoining this tract of Bogs weſt of the Cloydagh, I find moſt excellent manuring gravels in Killurin, Annaghmore, and Gurteen; indeed the Hill of Killurin is entirely composed of the fineſt limeſtone rock; and the lands of Annaghmore also abound with the same materials, which are rendered ſtill more valuable by their contiguity to those Bogs, whereby the progress of liming may be effected at a reasonable expense, by ſubſtituting turf inſtead of culm, and which I am informed answers remarkably well, particularly in covered Kilns. The effects of sprinkling lime on drained Bogs, particularly if mixed with a portion of clay or gravel, are aſtoniſhing in producing a ſkin of kind grass; and I have it from authority on which I can rely, that lime itself, spread on a Bog properly prepared, will actually produce white clover. This fact, which I have from the experience and practice of Gentlemen long in the habit of reducing Bogs to a ſtate of cultivation (particularly from John Cassidy, of Monaſtereven, Esq.) I truſt is such as to completely refute the prevalent opinion, that the nature of Red Bog is such as cannot be ameliorated.

Of internal Manures there are, as before-mentioned, considerable tracts of Black Bog and Moors, which will produce ſtrong aſhes, and in Gurteen Bog there are many spots where gravel may be had within 4 or 5 feet of the surface. There is also another resource, which is more fully treated on in the Report upon Cuſh and Cloonagh Bogs, namely, the immense quantities of sand annually brought down by the floods of the River Clodagh.

The natural capability and circumſtances of this division of Bogs, weſt of the Clodagh, being now detailed, I beg leave to draw your attention to those Bogs on the eaſt side, which are generally denominated the Bogs of Clonagh, Rerymore, Cuſh, Ballinvally, and
1,545 Iriſh. Derrygunnigan, containing 2,502 acres 2 roods and 24 perches of Red Bog, Black Bog, and Moors, partly improved; and also including a ſtripe of bottom, paſturable and improved cuſh, along the course of the old river joining Pullagh.

966 Iriſh. The firſt or great division of these Bogs containing 1,564 acres 3 rood and 2 perches of Red Bog and ſhaking quagmire, together with 234 acres 3 rood and 20 perches of Black Bogs and Moors, &c. is situated on the eaſt side of the River Clodagh, ſtretching along the bounds between the King's and Queen's Counties for two miles, to near the New River Barrow, into which and the Clodagh River the whole of the waters connected with those Bogs are discharged.

The chief line for a Tap Drain in this division is the County Boundary before mentioned, commencing at the point where it falls into the Clodagh at Gurteen, and taking a direction up a natural vale or cuſh in the Bog, towards the summit, for 190 perches, with a fall of 12 feet to the Clodagh. From the summit, then the natural direction of the cuſh is towards the River Barrow at Pullagh, to which I have directed the continuation of the Tap Drain with a fall of 12 feet in 350 perches; making in the whole a diſtance of 540 perches, which entirely commands the north side of this extensive tract (as appears by the Map and line of Section, No. 23). The next line of proposed Tap Drain commences also at the Clodagh, and continues between the Red and Black Bogs round the south and eaſt verges.

This Drain, by being sunk to the depths proposed (and as appears in Section No. 17) will effectually cut off the head of springs contained in the Black Bogs of Clonagh. These springs are now so great that a Drain made from 12 to 18 inches deep is immediately filled with water, and the bottom so soft that it swells up to near its original level in a few months; so that it is almoſt impossible to sink a Drain three feet deep at the firſt operation, and therefore muſt be proceeded on by slow degrees. I have also laid out another line of Main Drain, communicating with the laſt-mentioned near the Clodagh. This Drain is laid out on a higher level of the Red Bog, and at a diſtance of about 100 perches from No. 17, with which it forms a junction near the Clodagh. From this point of junction its course is
270 Iriſh. directed round the south and eaſt verges of the Bog, cutting off about 437 acres 1 rood and 16 perches from the great mass of ſhaking Bog; which quantity, it is presumed, will be brought to a ſtate of consolidation by the operation of those two Drains, No. 18 and 19, and by the communicating Surface Drains laid out between them. The average sinking of this Drain is proposed to be 10 feet, and the whole length 688 perches. Through the centre of the remaining mass of Red Bog, which is literally a ſhaking quagmire, full of duck pools that are never empty even in the dryeſt season, I have laid out three lines of Main Drains, connecting themselves with Main Drain No. 18, and discharging chiefly by the County Bounds, and into the Clodagh River. The sinking of these Main Drains (see Sections No. 20, 21, and 22) is proposed to be from 8 to 12 feet, falling pretty much with the

the natural declination of the Bog, which I find to be from 10 to 12 feet in a mile. With these Main Drains I have connected a line of Irrigation Drain from the Clodagh, by which means a supply of water may be had in the dryeſt season, which being brought into the summit of the Bog may be turned over the whole surface by damming up the Main Drains at proper levels.

The advantage of Irrigation in dry seasons being universally admitted, does away the necessity on my part of using any argument to prove its efficacy. I ſhall however go further than merely recommending its use in promoting vegetation in hot parching weather, for in this particular case its application in winter would be equally, if not more beneficial than in summer time. My reasons for this assertion do not reſt on the mere speculations of my own fancy, they are founded on facts incontrovertible in themselves, and well ascertained by the common people living on the borders of the Bogs of which I am now treating, and which are simply as follows. The River Clodagh, as I have before-mentioned, is a conſtant ſtream from the Slieve Bloom Mountains, which, like all other mountain ſtreams, rises suddenly and runs rapidly in time of flood, carrying with it immense quantities of fine sand and clay, which it deposits along its course to the Brusna. The effect of the sand thus deposited on the Bog is such, that the verges of it, which have been annually flooded for ages paſt, are now reduced to good meadow paſture and tillage on sand and clay, under which there is in many places from 10 to 12 feet of Bog; in fact, it has created land that now supports many families. If then Nature, unaided by art, has done so much, what may we not expect from her bountiful hand when assiſted by man's induſtry? There is another fact which ſhould not be omitted, to prove that these profitable verges have been made so by the effects of the Clodagh, namely, that the bed of the River itself reſts on Bog of from 8 to 10 feet deep; this I have proved by boring in the centre of it, where after passing through a ſtratum of gravel two feet, I found a ſtratum of Bog ten feet deep; which proves beyond a doubt, that the present course of the River is new, and that it muſt have been diverted that way since the formation of the Bog. For these reasons I recommend taking in a supply of water from the Clodagh, to be used at all seasons if necessary. I do not mean that the whole course of the river ſhould be turned this way (although in the present state of the Bog it could not be made worse) but that it ſhall by means of a sluice be admitted in such quantities as the season and object of flooding may require; and after passing through the whole of the Main and Surface Drains it may be discharged, partly into a lower level of the Clodagh, and partly into the River Barrow at Pullagh.

With the proposed Main Drains already described, and the cross Surface Drains connected with them, as marked on the Map, I have also to recommend the scouring and deepening the old River at Pullagh, and also the cleansing of all the Drains now opened in the Black Bogs and Moors adjoining Cloonagh and Rerymore.

BALLINVALLY and DERRYGUNNIGAN BOGS, containing 638 acres and 394 Iriſh.
35 perches of deep Red Bog, which may be considered as connected with and forming a part of the Bogs laſt-mentioned, being only divided from them by an imaginary line of boundary between the King's and Queen's Counties, and which line forms the subject of Section No. 23, the particulars are already mentioned; it will also form the main Receiving Drain for the waters of this denomination. In addition to the aid of this Drain I have laid out a long line of Catchwater Drain, commencing at the River Clodagh, and running along the Bog edge under the hills of Ballinvally and Ballinsragh for near two and a half miles, and falling into the River Barrow at Quarrymount, sinking from 6 to 10 feet, as appears by Section No. 24. By these two Drains the Bog will be completely surrounded, and also intersected by another Branch Drain connected with No. 23. By referring to the Map it will be seen that the island of Derrygunnigan, containing near 75 acres, lies pretty much in About 60 Iriſh.
the centre of the greatest portion of this Bog. From this island (with the exception of a partial fall round its edge) the natural declination of the Bog falls on all sides from it; so that taking it as a centre, the Surface Drains may be laid out to fall from it into the Main Drain No. 23, and into the Catchwater Drain No. 24; a few of them will also fall into the ſtream at the south verge near the Barrow, as marked on the Map.

It is also necessary, in order to effect the Drainage, to scour and sink the Glaſha ſtream from the River Barrow to its junction with Main Drain No. 23; and also to scour and sink the present Drains round the wood of Derrygunnigan, for which I have provided in the Eſtimate.

Manuring gravel of excellent quality may be had along the line of Catchwater Drain under Ballinvally; and a portion of the Bog being a good grazing cuſh, through which the line of Main Drain No. 23 is proposed to run, will, when drained, produce a good quantity of aſhes. From the interior of the Bog nothing of that description is to be expected; but there is no part of it further than a quarter of a mile diſtant from the gravel.

It is necessary to remark, that there is a great portion of boggy and moory paſture and meadow on the south end of this Bog, near and adjoining the River Barrow, that would be materially benefited by the proposed Drainage; the expenses of which are particularly set forth in the following Eſtimate, and which closes my Report on the Second Division of this Diſtrict.

ESTIMATE of Expenses necessary to execute the proposed Works in the Bogs of KILLURIN, ANNAGHMORE, GURTEEN, CLONAGHBEG, &c. &c. on the Weſt Side of the River Clodagh, and also the Bogs of CUSH, REHYMORE, &c. &c. situate on the Eaſt Side of said River.

No. in Map and Section.		s.	£.	s.	d.
9.	To 226 perches of Main Drain in the Black Bog of Clonaghbeg, average 6 feet sinking - - - - - - - at	3/6	39	11	—
10.	To 190 perches of Main Drain between the Black and Red Bogs of Clonaghbeg, average 7 feet sinking - - - - -	5/10	55	8	4
11.	To 190 perches of Main Drain through the Red Bog of Clonaghbeg, average 8 feet sinking - - - - - - -	7/3	68	17	6
12.	To deepening and widening the County Bounds from Mr. Curtis's Tap Drain to Lough Annagh, 204 perches - - at	5/	51	—	—
	To deepening and widening ſaid Drain from the County Bridge to the commencement of the above 204 perches, being 160 perches - - - - - - - - - - -	2/6	20	—	—
	To 80 perches of 5-foot Drain from Lough Annagh along the County Bounds between the Glebe and Bogaderry Bogs - at	2/6	10	—	—
	To 128 perches of Main Drain from said County Bounds to the Stream at the Derrys, average 8 feet sinking - - -	7/3	46	8	—
13.	To 151 perches of Main Drain under the Lands of Bogaderry, and falling into Main Drain No. 12, average 7 feet sinking, at	5/10	44	—	10
14.	To widening and sinking 40 perches of Mr. Curtis's Tap Drain, commencing at the County Bounds, so as to make it 8 feet deep and 11 feet wide, deducting the value of the preſent Drain - - - - - - - - - - at	4/10	9	13	4
	To deepening and widening the remainder of Mr. Curtis's Tap Drain up to his Plantations, 110 perches - - - at	3/	16	10	—
	To deepening and widening 126 perches of Boundary Drain between Mr. Curtis and Lord Digby, from the Tap Drain to Killurin Bog - - - - - - - - - - at	2/	12	12	—
	To deepening and widening said Boundary between Killurin and Annaghmore Bogs, 200 perches to summit of Bog, average 9 feet sinking - - - - - - - - at	11/	110	—	—
	To Ditto, from summit down to the Turf Banks near the Sconce of Killurin, 240 perches, average 9 feet sinking - at	11/	132	—	—
15.	To 190 perches of centre Main Drain through the Bog of Gurteen, average 8 feet sinking - - - - - - at	7/3	68	17	6
16.	To 296 perches of proposed Receiving Drain at the foot of Killurin and Gurteen Hills, average 7 feet sinking - - at	5/10	86	6	8
	To deepening and widening 300 perches of Mr. Curtis's Main Drain, between his Bog plantations and Annaghmore, so as to leave it a clean Drain, 8 feet deep and 3 feet bottom, to intercept the land springs - - - - - at	6/	90	—	—
	To 2,320 perches of Surface Drains in the Bogs of Killurin and Annaghmore - - - - - - - - - at	2/6	290	—	—
	To 2,180 of Ditto in Clonaghbeg Bog - - - - - -	2/6	272	10	—
	To 2,080 perches of Ditto in Gurteen Bog - - - - -	2/6	260	—	—
	To 160 perches of Surface Drains in Glebe Bog - - - -	2/6	20	—	—
	To deepening and widening 200 perches of present Drains in Ditto	1/6	15	—	—
	To 800 perches of Surface Drains in Bogaderry Bog - -	2/6	100	—	—
		- £.	1,818	15	2
	Contingent and unforeseen Expenses £.20 per cent - -	- -	363	15	—
	TOTAL Expense of Drains proposed in Bogs Weſt of the Clodagh - - - - - -	- £.	2,182	10	2

Estimate of Expenses for the Bogs of Killurin, Annaghmore, Gurteen, Clonaghbeg, &c.—*continued.*

No. in Map and Section.					
	Eaſt of the River Clodagh.	*s.*	£.	*s.*	*d.*
17.	To 31 perches of Supply Drain 6 feet, by 5 feet and 3 feet at bottom, partly raised by embankments in upland and moory bottoms - - - - - - - - - - at	3/6	28	17	6
	To 384 perches of said Drains through Red Bog, and communicating with Main Drains No. 19, 20, 21 and 22, average 8 feet sinking and 3 feet at bottom - - - - -	7/3	139	4	—
	To a Guard Sluice at the Clodagh - - - - -	- -	15	—	—
18.	To 562 perches of Main Drain, average 7 feet sinking and 3 feet bottom in deep Black Bog - - - - - -	5/10	163	18	4
19.	To 210 perches of Main Drain, commencing at the County Bounds, in deep Bog, average 10 feet sinking - - at	15/7	163	12	6
	To 352 perches Ditto, average 9 feet sinking - - - - -	11/	193	12	—
	To 166 - D° - - D° 6 - d° - - - - -	3/6	29	1	—
20.	To 160 perches of Main Drain through the centre of the shaking Bog - - - - - - average 10 feet sinking - - -	15/7	124	13	4
	To 210 perches of D° - D° - 9 - d° - - -	11/	115	10	—
	To 144 D° - - D° - D° - 11 - d° - - -	18/2	130	16	—
21.	To 324 perches of Main Drain, forming a junction with Nos. 19 and 23, average 10 feet sinking - - - - - - -	15/7	252	9	—
22.	To 98 perches, commencing at the River Clodagh, average 8 feet sinking - - - - - - - - - - -	7/3	35	10	6
	To 120 perches of D° - average 10 feet sinking - - -	15/7	93	10	—
	To 48 D° - D° - - D° 9 - d° - - -	11/	26	8	—
	To 70 D° - D° - - D° 8 - d° - - -	7/3	25	7	6
23.	To 40 perches of Main Drain along the County Bounds between Pullagh Bog and Derrygunnigan Bog, average sinking 6 feet and 3 feet bottom - - - - - - - - -	3/6	7	—	—
	To 114 perches of D° - average 8 feet sinking - - -	7/3	41	6	6
	To 114 D° - D° - - D° 10 - d° - - - -	15/7	88	16	6
	To 80 D° - D° - - D° 9 - d° - - - -	11/	44	—	—
	To 180 D° - D° - - D° 11 - d° - - - -	18/2	99	—	—
24.	To 110 D° of Catchwater Drain, commencing at the River Clodagh near Gurteen Bridge, average 6 feet sinking - -	3/4	19	5	—
	To 170 perches of D° - - - - - D° 8 - d° - - -	7/3	61	12	6
	To 310 D° - D° - - - - - D° 9 - d° - - -	11/	170	10	—
	To 170 D° - - D° - - - - - D° 6 - d° - - -	3/6	29	15	—
	To deepening and widening 1,600 perches of present Surface Drains in the Black Bogs of Cloonagh - - - -	1/6	120	—	—
	To deepening and widening 240 perches of the Glaſh Stream from the River Barrow to its junction with Main No. 23 -	3/	36	—	—
	To 105 perches of Cross Main Drain through the Bog of Derrygunnigan, and falling into Main No. 23, average sinking 8 feet - - - - - - - - - -	7/3	38	1	3
	To deepening and widening the old River and all the small Drains connected therewith, from the River Barrow to Rerymore, in all 1,400 perches - - - - - -	1/6	105	—	—
	To 6,780 perches of Surface Drains in Clonaghbeg Bog - -	2/6	847	10	—
	To 2,920 perches of D° - - - - in Derrygunnigan and Ballinvally Bogs - - - - - - - - -	2/6	365	—	—
		£	3,610	6	5
	Contingent and unforeseen Expenses, £.20 per cent. - -	- -	722	1	3
	TOTAL Expense Eaſt of the Clodagh - - - -	- £.	4,332	7	8
	Expense of Drains Weſt of the Clodagh brought from page 102 - - - - - - - -	- -	2,182	10	2
	GENERAL TOTAL Expense of Drains proposed on the Weſt and Eaſt side of the River Clodagh and Second Division - - - - - -	- £	6,514	17	10

THIRD DIVISION.

DERRINBOY, CADAMSTOWN, and LETTYBROOK BOGS.

A. R. P.
982. 2. 25. Ir.

THESE Bogs are situated between Ballyboy and Cadamstown, containing 1,509 acres 3 roods and 29 perches, including some small ſtripes of boggy meadow and paſture. There are three good outlets, two communicating with the Weſt or great Division, and one communicating with the Eaſt Division, called Kilmacuddy or Cadamstown Bog. The firſt of these outlets of the Weſt Division is a Tap Drain at Mr. Mitchell's, commencing at the New Road at Munny, and carried to the Bog edge by Mr. Mitchell (to tap the great springs issuing from the Bog-holes) for 100 perches, in which he had for part of the way 8 feet sinking in running gravel; the fall of this Tap may be further increased by additional sinking at said gravel hills ſhould it be found necessary; but I do not recommend any further increase of fall, it being at present from 16 to 25 feet below the surface of the Bog with which it is connected.

The second Tap, joining the same Division of the Bog, is the ſtream at Knockbarren, into which Mr. Drought has directed a long line of Main Drain on the edge of the Bog of Lettybrook, and with which I have proposed communicating also.

This Tap is from 18 to 22 feet under the surface of the Bog with which it is connected. Another Tap to this Division of the Bog may also be had by communicating with the outlet ſtream of the Eaſt Division. This Tap I propose to bring up from the Barony ſtream at Coolfin to the wooden pipe on the Road between Lettybrook and Derrinboy, where I propose to sink the drain 7 feet below the surface of the Road, in order to tap the deep ſhaking Bog lying between the said wooden pipe and Knockbarren. A great portion of this Weſt Division of the Bog is very deep, (as appears by the Sections) and it is a remarkable circumſtance, that although it lies under the high lands at the foot of Slieve Bloom Mountains, it rises to its summit the whole of the way as it increases in diſtance from the Mountain foot; so that the natural surface of the Bog at Derrinboy is six feet higher than the natural surface a mile and a half nearer to the Mountains, the declination being to the Mountains inſtead of falling with them.

Manuring gravel, of excellent quality, can be had in the centre of this Bog, not more than five or six feet from the surface; and also near Derrinboy, and along the Bog edge at Munny on the North, and Lettybrook and Knockbarren on the South, there are similar ſhallow spots where gravel may be had in abundance; but very little or none of the like materials is to be had on the weſt at Annaghmore, being chiefly composed of light running gravel and moors.

In this Weſt Division of the Bog I have laid out a chief Main Drain (see Section No. 26.) commencing at the Tap Drain made by Mr. Mitchell, before-mentioned, taking a central course through Derrinboy and Annaghmore Bogs, and continuing through Knockbarren and Lettybrook Bogs, and connecting itself with a Cross Main to Derrinboy, (see Section No. 28) and also with the Tap Drain to the Barony or wooden pipe before-mentioned (see Section No. 27.) This line of Main Drain is proposed to empty itself partly into the Tap at the Barony Pipe, and down to Baldwin's Bridge; and also a small portion of the water will fall into Mr. Drought's Main Drain at Lettybrook. These different outlets to the Main Drain are proposed to prevent the necessity of deep sinking at any particular point; and also that the said Main Drain may be more readily converted into a navigable cut to be supplied from the Mountain ſtream at Lettybrook This ſtream at Lettybrook can be taken up at such a level as completely to command the greateſt extent of surface of the Bog, and will be a never-failing supply for canal or irrigation purposes.

The benefits likely to result from a water communication through the higheſt and moſt central part of the Bog are obvious, and muſt be admitted, when it is considered that by such means (and that only) manuring gravel of the beſt kind can be diffused at a comparatively reasonable expense over the surface of between 5 and 600 acres of unprofitable Bogs. This navigable level may also be extended to the Kilmacuddy Bog (by crossing the road) and carried one quarter of a mile into the centre, (see Section No. 29.) being as far as the level will permit, at which point one or more overfalls may be made to communicate with the small Surface Drains, and thereby to irrigate the whole of that Division when necessary.

I would alſo recommend a Main Drain through the Cadamstown Diviſion of the Bog, which at a future period may be converted into another navigable cut and fed by the ſtream from Kilmacuddy, and can be used either for canal or irrigation purposes. Should it be deemed advisable to run a navigable cut into the Cadamstown Bog for the supply of gravel to the interior, an abundant supply of both gravel and water can be had at the hills of Kilmacuddy, not more than 120 perches from the Bog, and through a very favourable line of bottom ground.

The outlet ſtream to Baldwin's Bridge, already mentioned, communicates with the Kilmacuddy and Cadamstown portion of the Bogs, and after passing through Baldwin's Bridge falls into the Mountain River from Cadamstown, where it divides the King's and Queen's Counties. The fall of this ſtream from the bottom of the pipe under Ballyboy Road at Lettybrook, to the surface water under Baldwin's Bridge at Lugnabola, is 10 feet 6 inches in a diſtance of a mile and a half; and the fall from the Bridge to the junction of the Mountain River from Cadamstown, is in summer time 11 feet in a diſtance of one mile and an half and 18 perches. (For particulars see Section No. 25.) In this laſt part of the outlet I am unwilling to propose any great improvement of the fall by deep sinking, leſt I ſhould thereby divert the Mountain torrents from Cadamstown up to Baldwin's Bridge, which would certainly choak up any cut that might be made to improve the fall with the immense quantities of sand and stones brought down in flood time, and therefore I ſhall only advise the course of the ſtream to be scoured at and below the Bridge for about 80 perches. At present the Cadamstown River passes near this portion of the Bog at the Curragh of Cadamstown, and is embanked at a great expense to confine it in time of flood, otherwise it would, as it has done, break its bounds, and running over the adjacent low grounds, carrying away every impediment, its torrent would reach the Ballyboy Road and the Bog adjoining, and commit such ravages as the violence of the flood would permit.

The ſtream above-mentioned running from the pipe at Lettybrook Bog to Baldwin's Bridge, having a fall of 10 feet 6 inches as before recited, runs almoſt the whole of the way through a low cuſh of fine bottom paſture and meadow which divides the Bogs of Kilmacuddy and Cadamstown. This ſtream I propose to deepen the whole of the way from Baldwin's Bridge to Lettybrook turf banks, and to widen it to the breadth of the arch of said Bridge, which is ten feet, till it meets with the ſtream at Kilmacuddy. The object of lowering this ſtream is to bring into immediate cultivation a long tract of cuſh, in which are many spots of good paſture and meadow, which are now generally covered with water for several months in the year; and also to further the improvement of the moory periphery of the Bog the whole way from Baldwin's Bridge to the pipe at Lettybrook, and to the Barony pipe on the Road to Derrinboy; on the whole it will effect the drainage of above an hundred acres of bottoms, Moors, and Bogs, which are now subject to be inundated by every ſhower of rain that falls on the Slieve Bloom Mountains.

In a dry season the Main and Navigable Drains proposed in Kilmacuddy and Cadamstown Bogs being on a high level, can be opened, and the whole surface laid under water; for which reason, wherever it is possible to procure gravel and water on the high levels, I have preferred running my Navigable Cuts from them, in order to have a command of water over the surface, and also to facilitate the carriage of gravel from the boats, it being much easier to convey the gravel down the declivity of the Bog, than to bring it up from a low level to the summit of the Bogs.

It may be said that the summit of the Bogs will fall considerably when drained, which I admit; but ſtill you have the supply of water and gravel above you, and therefore it is only necessary to sink the cut as the Bog consolidates, which can easily be done, particularly as I do not mean to recommend any permanent masonry in the proposed Bog Navigation Cuts. Where Bridges, Sluices, or overfalls, become necessary in such bad foundations, it is my opinion they ſhould be composed of timber (Bog timber, wherever attainable, both for economy and durability) or such other materials as would not be injured by the compression of the Bogs on which they muſt be erected.

The Road Drain on the weſt side, from Derrinboy to Lettybrook, ſhould be sunk from three to four feet deeper (as marked in Section No. 30) the chief of the waters falling to the outlet at the wooden pipe, and so down to Baldwin's Bridge; and also the Drains on each side the Cadamstown Road, and the small Protection Drains above the Cuſh and Grazing Bogs of Coolfin, which are now not above one foot deep, ſhould be sunk three feet more, leaving Bog Bridges both in these and the Surface Drains at every 20 or 30 perches, as before recommended. The Land Drains under Coolfin ſhould also be sunk and widened; and I also recommend a ſhort 8-feet Receiving Drain in Annaghmore Bog, falling into the Tap at the ſtream of Knockbarren.

These Main and Collateral Drains, with the communicating Surface Drains, as marked on the Map, will, I truſt, be sufficient to bring into immediate profit the great portion of Black Bogs and Bottoms connected with these tracts, and eventually to reduce the whole of the Bog to a ſtate fit to receive manures and other agricultural improvements.

ESTIMATE of Expenses necessary to execute the propoſed Works in DERRINBOY and CADAMSTOWN BOGS, &c.

No. in Map and Section					
		s.	*£.*	*s.*	*d.*
25.	To scouring the Stream below Baldwin's Bridge, 80 perches - at	2/	8	—	—
	To widening and deepening the Stream from Baldwin's Bridge to the turf banks at Lettybrook, so as to leave it 10 feet wide at top and 6 feet bottom, average sinking 3 feet additional in bottom paſture and Curraghs; the whole length 530 perches - - - - - - - - - -	6/	159	—	—
	To taking down the present Pipe at Lettybrook turf banks, and erecting a Bridge 4 feet lower with an arch 6 feet wide -	- -	15	—	—
26.	To 280 perches of Main Drain through Red Bog, average sinking 9 feet, batter 6 inches to a foot, and 3 feet at bottom - at	11/	154	—	—
	To 234 perches of D° - Average 11 feet sinking - -	18/	210	12	—
	To 73 perches of D° - D° - 10 - D° - - -	15/7	56	17	7
	To 40 perches of D° - D° - 13 - D° - - -	28/	56	—	—
27.	To 88 perches, commencing at the Centre Main No 25, and proceeding towards the Barony Pipe, average 12 feet sinking and 3 feet bottom - - - - - - - -	24/6	102	16	—
	To 29 perches of ditto, ending at the Barony Pipe, average 9 feet sinking - - - - - - - - - - - -	11/	15	19	—
	To 82 perches of Main Drain, running from the centre line No. 26, to the outlet at Mr. Drought's new Main at Knockbarren, average 10 feet sinking - - - - - - at	15/7	63	17	10
	To deepening and widening Main Drain from Barony Pipe to junction of ſtream from Coolfin, 127 perches, average 4 feet additional sinking - - - - - - - - -	6/	38	2	—
	To erecting a new wooden pipe, &c. - - - - - -	- -	10	—	—
28.	To 84 perches of Cross Main, from line No. 26 towards Derrinboy, average 10 feet sinking - - - - - - -	15/7	65	9	—
29.	To 288 perches of Main Drain through Kilmacuddy Bog, communicating with Main Drain No. 26, and which may be made to serve as an irrigation and partly a navigable Drain fed from No. 26, average 7 feet sinking - - - - - - -	5/10	83	19	—
	To a wooden Bridge over Main Drain, No 29, capable of passing a gravel float - - - - - - - - - -	- -	50	—	—
30.	To 360 perches of Weſt Road Drain, between Derrinboy and Lettybrook Pipe, average 4 feet, additional sinking according to Section No. 30 - - - - - - - - - -	6/	108	—	—
31.	To 16 perches of Main Drain through Cadamstown Bog, commencing at the Barony Stream near Lugnabola, average 7 feet sinking - - - - - - - - - - - -	5/10	4	13	4
	To 40 perches of D° - Average 8 feet sinking - -	7/	14	—	—
	To 114 D° - D° - D° - 10 - D° - - -	15/7	88	16	6
	To 160 perches of 8 feet Drain at Annaghmore Bog, and falling into the outlet ſtream at Knockbarren, - - - - at	7/3	58	—	—
	To deepening and widening the ſtream from Coolfin Bridge to the junction with Main Drain No. 27, whole length 80 perches -	2/	8	—	—
	To deepening and widening 180 perches of Drain under Coolfin and Lugnabola adjoining the Black Bogs - - - - at	2/	18	—	—
	To 3,050 perches of Surface Drains in Weſt Division - at	2/6	381	5	—
	To 2,000 perches of Surface Drains in Eaſt Division - at	2/6	125	—	—
	TOTAL for Drainage - - -	- £.	1,895	7	3

Estimate of Expenses for Derrinboy and Cadamstown Bogs, &c.—*continued.*

No. in Map and Section.	——				
	Additional Expense of converting certain of the Main Drains into Navigable Cuts.	s.	£.	s.	d.
31.	To widening 138 perches of Main Drain No 31, to the navigation size, namely, 14 feet bottom and 4 feet water, with a batter on each side of six inches to a foot, average 10 feet sinking, or 63 yards additional excavation to the running perch, at 3 *d.* per yard	- -	108	13	6
	To continuing said Canal for 40 perches in the Curragh of Cadamstown, average 8 feet, or 89 yards to the running perch	22/3	44	10	—
	To 40 perches more, average 10 feet sinking, or 147 yards to the running perch, at 49 *s.*	- -	98	—	—
	To 44 perches of ditto, up to the supply of gravel and water at Kilmacuddy, average 12 feet sinking, or 189 yards to the perch at	63/	138	12	—
	To dressing down the Banks and forming Trackways on both sides for 264 perches	10/	132	—	—
	To erecting a Sluice at the end of the Cut to run off the water occasionally	- -	10	—	—
	TOTAL Expense of converting Main 31 to a Navigable Cut	- £.	531	15	6
	Eſtimate for additional Excavation to convert No. 26 to a Navigable Cut.				
	To 152 perches, average 10 feet sinking, or 111 additional yards of excavation to the perch at	32/4½	246	1	—
	To 134 perches of D° - Average 10 feet sinking	17/6	117	5	—
	To 40 perches of D° - - D° 11 - D°	32/	64	—	—
	To 40 perches of D° - - D° 12 - D°	34/1½	68	5	—
	To 33 perches of D° - - D° 9 - D°	17/6	28	17	6
	To 80 perches of D° - - D° 15 - D°	44/	176	—	—
	To 40 perches of D° - - D° 13 - D°	36/	72	—	—
	To 80 perches of D° - - D° 8 - D°	16/3	65	—	—
	To 90 perches of Supply Drain at Lettybrook, through clay and gravel, &c.	3/	13	10	—
	To a Pipe across the Road at D°	- -	10	—	—
	To regulating the Banks and forming Trackways on both sides, for 599 perches	10/	299	10	—
28.	To 84 perches of Canal to Derrinboy, average 14 feet sinking	63/	273	—	—
	To dressing Banks and gravelling Trackways	10/	42	—	—
29.	To 46 perches of Branch Line into Kilmacuddy, average 11 feet sinking	37/4	85	17	—
	To 80 perches of D° - Average 8 feet sinking	13/	50	14	—
	To dressing Banks and gravelling Trackways, 126 perches	10/	63	—	—
	To 1,073 perches of Back Drains on both sides of the Canals	5/	268	5	—
	TOTAL Expense of Navigable Cuts for 3 miles, 2 furlongs and 35 perches	- £.	2,475	—	—
	TOTAL Expense of Drainage brought forward	- -	1,895	7	3
		£.	4,370	7	3
	Contingent and unforeseen Expenses, £.20 per cent.	- -	874	1	5½
	TOTAL Expense for 3d Division	- £.	5,244	8	8½

FOURTH DIVISION.

Comprehending PULLOUGH, BALLINACOR, DERRYCOOLY, DERROOLY, KILLARANY, and ROSSGORE BOGS.

3,075 Iriſh. The whole containing 4,980 acres 3 roods and 38 perches.

THESE Tracts of Bog are a portion of the immenſe waſtes of that deſcription which lie between Tullamore and Shannon Harbour; they are bounded by the Grand Canal on the north, by a ſtream called the Barony Stream on the weſt, and by the Road from Cloghan to Tullamore on the ſouth, and are about five miles diſtant from the latter town.

Nature has ſubdivided these Bogs into seven parts, by ſeveral ſtreams which interſect them; and also by the intervening profitable lands and islands, namely, Ballinacor, Derry-ooly, and Derrycooly, which laſt island contains above 440 acres; they are also interſected by two Supply Drains to the Grand Canal.

The firſt part of these Bogs which I ſhall particularize is called Pullough and Derry-cooly Bog, containing 1,158 acres and 28 perches, and through which the Grand Canal extends for above a mile, cutting off 288 acres 1 rood and 13 perches to the north of said Canal. In this Bog great indeed was the difficulty of carrying the Canal through it, so much so that it was neceſsary to put it in a ſtate of preparation by scarifying its ſurface for several months before they commenced their excavation, which is about 20 feet under the preſent ſurface of the Bog. This difficulty is easily accounted for, by the numerous springs that lie between the Canal and Derrycooly, and which now make their way by various paſsages to the Tunnel at Pullough, where they fall into the Barony Stream.

This Bog is extremely wet, and full of innumerable duck-pools on and near the summit of it, through which I have laid out a line of Main Drain according to Section No. 33, and also a parallel 8-foot Receiving Drain; these two Drains will diſcharge their waters into the Barony Stream, and paſs under the Canal by the Pullough Tunnel into the River Brusna.

907 Iriſh.

Connected with this Bog, and on the ſouth ſide of Derrycooly, is another large tract of Red Bog belonging to Derrycooly and Oughter; it is bounded on the weſt by the Barony Stream, on the eaſt by the ſtream from Derrymore, on the north by Derrycooly, and on the ſouth by the Road from Tullamore to Cloghan, and contains 1,469 acres and 30 perches. The summit of this Bog is 46 feet above the keyſtone of Macartney Aqueduct, and 16 feet above the summit of Pullough Bog, with a surface nearly as wet and in the ſame ſtate of nature, with the exception of a portion joining Derrycooly, and along the verges of the ſtreams and small islands called The Derrys. There is, however, great capability for effectual Drainage, the Bog having ample fall on the weſt to the Barony Stream, and on the eaſt to the ſtream from Derrymore to Derrycooly. The Bog in the vicinity of the latter ſtream is chiefly a dead flat, with an abrupt fall to the ſtream, but the declination to the former is long and gradual, being a hanging level for upwards of half a mile from the summit, in conſequence of which the verges of the Barony Stream are dry and firm in summer, and produce good coarse grazing; in fact the whole vale along it from Pullough to Oughter, being a diſtance of two miles, is of that deſcription of improvable Bog, that wherever the experiment has been tried to rear potatoes, oats, or rape, they have ſucceeded to the utmoſt expectation of the improver; and although much has been done about Derrycooly, yet the improvements would have been considerably more extenſive but from an uncertainty in the title of the adjoining lands, which is and has been for some time litigated. I ſhall only mention one circumſtance of actual improvement which has been effected on the verge of the Bog of Derrycooly, which is, that from the simple operation of *burning* only, the tenants ſhewed crops of potatoes and oats that appeared as promiſing as any in the country, but being in such small portions as their scanty means would permit, can only be viewed as living inſtances of what might be done on an extenſive scale.

The Barony Stream, which, as before-mentioned, bounds the weſt side of this and Pullough Bogs, runs from the Tullamore Road to the Tunnel under the Grand Canal at Pullough, with a fall of 33 feet in two miles and three furlongs, running the whole way through limeſtone and gravel, and on which there can be had at leaſt three mill sites of seven feet fall each, besides ample run for the water, as before obſerved in the preliminary to this detailed Report.

This ſtream being already sufficient to receive the waters from my propoſed Drains on each side, I do not mean to recommend any improvement on it; nor ſhould I have thought a Section of it neceſsary but to ſhew the command of its waters, which is deſcribed in Section No. 40.

Though

Through the centre of this Bog I have laid out a line of Main Drain, extending from the sunk Bridge on the Road near Derrymore, and falling into the ſtream at Derrycooly with a fall of near 30 feet (see Section No. 34); and also a branch of Main Drain to the Barony Stream, with a fall of 17 feet (see Section No. 35.) I also propose two Receiving Drains 8 feet deep, communicating with Main Drain No. 34, and falling into the eaſtern ſtream, the falls of which are proposed to be improved according to Section No. 32, on which is also described the level of the supply to the Grand Canal, which I propose to deepen and widen to the size recommended for Navigation Drains, in order that the good manuring gravel of Corrinalaur may be conveyed to the Bogs of Corrinalaur, Derrooly, and Derrycooly, for a diſtance of a mile and an half, at the termination of which the present ſtream at the point B will be lowered 6 feet, and carried up on an average 7 feet, sinking the whole of the way to the Road at Derrymore, improving the fall for above two miles (as appears by Section No. 32) chiefly with a view to carry off the numerous springs, in the neighbourhood of Derrymore, many of which rise to the surface in an extensive tract of Black Bog and Moors, full of quagmires, sedge, &c. &c. The advantages to be derived by lowering this ſtream would extend far beyond the limits of my Survey, which only describes the effects likely to be produced on the actual Red and Black Bogs, now under consideration. These two Bogs, forming the 1ſt and 2d parts of the Fourth Division of the Diſtrict, may be considered as one great mass, divided only by the arable Island of Derrycooly, and bounded by the two ſtreams on the eaſt and weſt, as before-mentioned. Their greateſt depth is from 25 to 30 feet, and the under ſtrata are chiefly blue clay and limeſtone-gravel, but which from their general depths I do not mean to recommend raising to the surface; however, the courses of the ſtreams on both sides afford a supply of limeſtone and manuring gravels, and the Islands of Oughter and Derrycooly also afford the same materials, which are in general not more than half a mile from the centre of the Bogs.

The effect of manuring gravel in Bogs is so well known as to render any observation on my part unnecessary; and with regard to the effects of lime itself, I am assured from good authority, that it answers well in producing vegetation on Bogs *when properly prepared by Drainage.*

The third part of this Division comprehends Ballinacor, Derrooly, and Corrinalaur Bogs, containing 382 acres 1 rood and 4 perches. They are situated adjoining Pullough and Derrycooly Bogs on the eaſt side, and also adjoining the lands of Ballinacor and Derrooly. Through the firſt of these portions, namely, Ballinacor and Corrinalaur Bogs, the supply to the Grand Canal is carried for above 200 perches; this supply is in general about 9 feet wide, 6 feet deep, and about 18 inches of water; it is sunk deep through the fine gravel hills of Corrinalaur. In order to diffuse the benefits of this gravel I have proposed to widen and deepen this Supply Drain, and to continue it on a navigation size, namely, 14 feet bottom, and 4 feet water to the point B, as before-mentioned. Through Ballinacor and Corrinalaur Bogs I propose the present line of old Centre Drain to be deepened and widened, so as to leave it a good 8-feet Drain, into which the Surface Drains between it and the land will discharge themselves; the space between this line of Centre Drain and the navigation line will be intersected with Surface Drains, falling chiefly into the back Drain of said proposed Navigable Cut. The part of Derrooly Bogs, joining the Navigable Drain, contains 174 acres 3 roods and 31 perches, the whole of which is a fine dry firm Bog, capable of receiving any agricultural improvement, so much so, that at present there is nearly one-fifth of it in a ſtate of cultivation, and covered with rape, paſture, and potatoes. The proposed Navigation will bound the whole of the weſt side of this tract, and thereby afford ample opportunity of gravelling the surface, particularly as it will be connected with two Roads crossing the Bog into Derrycooly.

236 Iriſh

108 Iriſh.

The remainder of the Bogs in this Fourth Diviſion are Derrooly, Killarany, Roſsgore, and Newtown Bogs, containing 1,584 acres and 31 perches, which although forming one entire mass, are yet so intersected by ſtreams, that the Drainage of one portion is scarcely connected with that of the other, except where a ſtream recommended to be sunk is the common carrier or ventage to the Bogs on both sides, as in the lines of Sections No. 32 and 36.

It therefore, in such case, becomes necessary that each particular Bog ſhould have its own line of Centre Main Drain, into which, and the bounding ſtreams, the whole of the Surface Drains will discharge.

The firſt and moſt general line of Drainage is represented in Section No. 36; this line, commencing at C, is proposed to run along the present ſtream between Killarany and Newtown Bogs, as far as D, at which point it is proposed to be sunk six feet, and from which it is continued up a vale or cuſh, till it meets the Grand Canal supply at E, into the Road Drain at F, and into the Roſsgore Rivulet at G. Into this centre line of Drainage the chief of the Surface Drains of Roſsgore and Killena Bogs are directed. The centre Mains of Newtown (Sections No. 38 and 39) and the Main Receiving Drain in Killarany, are also to discharge their waters into said Main, Section No. 36.

Between Roſsgore and Killiranny Bogs there is at present a good outlet ſtream, which on being scoured and widened, will also receive a portion of the surface waters. The ſtream between Derrooly and Killiranny Bogs is also an excellent outlet ſtream that do not require any sinking. From the point H in Section No. 37, I propose to bring up a Tap Drain through the centre of Derrooly Bog by the Letters I and K, where it forms a junction with the Main Drain No. 32, and into which it will partly discharge its waters. This is the laſt of the Main Drains I propose recommending in these Bogs, which, with what I have already mentioned, aided by the communicating 8-foot and Surface Drains, will, I truſt, be ſufficient to reduce the whole to a ſtate of consolidation.

The laſt portion of the Bogs comprised in the Fourth Division, and which, as already ſtated, contains 1,584 acres and 31 perches, is in general remarkably well circumſtanced for improvement, being subdivided by numerous ſtreams and cuſhes, the verges of which are almoſt all inclined to spontaneous vegetation and highly susceptible of improvement; and although the extent is great, yet it happens from the irregularity of its circumference (except in a few cases) that good manuring gravel can be had within 100 perches of any part of the interior of the Bog. This irregularity of ſhape gives it another advantage, inasmuch as its verge is double the extent that a Bog of twice the quantity would be, if tolerably square, consequently it affords the opportunity of its improvement being undertaken by double the number of persons that could otherwise be employed on it, if its ſhape approached nearer to a square or circle; and also for the like reasons, the quantity of convenient manures is proportionably increased.

The north verges and indentures of all these Bogs, including the islands of Derrooly and Derrycooly, afford good limeſtone and gravel; however, I do not find that much use has been made of these excellent materials, except in the islands of Derrycooly, Derrooly, and Oughter, where they are in the habit of liming their upland and bottom grounds with considerable advantage.

On the south side, and along the verges of Roſscore and Derrymore Bogs, there are very little of the good materials to be found on the north, being chiefly composed of running gravel and sand. I am, however, informed by an intelligent Farmer in that neighbourhood, that even those light gravels and sand have been found to answer extremely well on the Bogs, and to have produced a good grassy surface mixed with kind herbage; indeed there is scarcely any description of clay, gravel or sand, that will not produce a change in the nature of Bogs, provided they are properly prepared by drainage to receive the benefit of such manures; there are however some description of loamy or limeſtone gravels that are found to be much more laſting than others of a lighter nature, and therefore ſhould be preferred, if even more expensive.

In these as well as almoſt all other cases of extensive Bogs, the surrounding proprietors have paid little attention to their respective portions, and therefore the precise extent of each person's property is in very few inſtances ascertained. The title to the part northward of Derrycooly is at present litigated, but the remainder of the Bogs are the undivided property of Lord Farnham, Mr. O'Brien, and Mr. Conroy.

There are many situations in these Bogs where plantations might be propagated with success, and yet it is extraordinary that nothing of the kind has been done, either in the surrounding country or in the islands connected with them. It is certainly not a want of capability that prevents such species of improvement for the numerous cuſhes intersecting the Bogs, and along the verges of Killarenny and Newtown Bogs, under the ſhelter of Derryooly and Ballinacor, and also the small Bog of Roſsgore (being completely surrounded by high lands) would all afford good situations for the growth of timber.

The foregoing being the only material Remarks I have to make on this Division, I now beg leave to draw your attention to the Eſtimate of the probable Expenses of the works proposed for its improvement, and which are as follows.

ESTIMATE of EXPENSES necessary to execute the proposed Works in PULLOUGH, BALLINACOR, DERRYCOOLY, DERROOLY, KILLARANY, and ROSSGORE Bogs.

No of Section.			
32.	To widening and deepening to a navigation size, viz. 14 feet wide at bottom, four feet water, and batter six inches to a foot, the Supply Drain through the Bog of Corrinalaur, 200 perches, average 10 feet sinking, allowing for the excavation already done - - - - - - - - - - at	s. 26/	£. s. d. 260 — —
	To 90 perches of D° in moory bottoms, average four feet sinking	10/	45 — —
	Carried forward - - -	- £.	305 — —

Eſtimate of Expenses neceſsary to execute propoſed Works in Pullough, &c.—*continued.*

No. of Section.			
		s.	*£. s. d.*
	Brought forward - - -	- - -	305 — —
	To 220 perches of Supply Drain, through the moory bottoms of Derrycooly, average nine feet ſinking, moſtly in new ground, to the point B - - - - - - - at	42/	462 — —
	To forming Trackways and dreſsing banks on one ſide for 290 perches - - - - - - - - - -	5/	72 5 —
	To - D° - - D° - on both ſides, 220 perches - -	10/	110 — —
	To building a Bridge acroſs the Road into Derrycooly, 10 feet ſpan, and 14 feet roadway - - - - - - -	- -	120 — —
	To 80 perches ſinking the preſent River from the end of the navigable line, and continuing up ſame on the Weſt ſide of Derrooly, average 10 feet ſinking, through limeſtone and gravel - - - - - - - - - - -	21/	84 — —
	To 40 perches D°, average 9 feet ſinking, through clay and gravel - - - - - - - - - -	17/8	35 10 —
	To 80 perches D° - - - 8 - D° - - - D° - -	14/6	58 — —
	To 240 perches D° - - - 9 - D° through Bog - -	11/	132 — —
	To 94 perches D° - - - 8 - D°, and ending at the Tullamore Road - - - - - - - - - -	7/3	39 1 6
33.	To widening and deepening 110 perches of preſent Drain, from the ſprings in Pullough Bog to the back Drain of the Canal, average 3 feet additional ſinking - - - - -	2/6	13 15 —
	To 30 perches, commencing at the ſprings, and going towards the ſummit of the Bog, average 8 feet ſinking - - -	7/3	10 17 6
	To 120 perches of D°, - average 11 - D° - - -	18/2	109 — —
	To 120 perches of D° - - - 10 - D° - - -	15/7	93 10 —
	To 86 perches of D°, and widening and ſinking the preſent Drain down to the propoſed navigable ſupply, average 6 feet ſinking - - - - - - - - - - -	3/6	15 1 —
34.	To 120 perches of Main Drain, commencing at B, Section No. 32, and verging along the South edge of Derrycooly, average 10 feet ſinking - - - - - - at	15/7	93 10 —
	To 34 perches of D°, average 9 feet ſinking - - -	11/	18 14 —
	To 200 perches of D° - - - 11 - D° - - - -	18/2	181 13 4
	To 160 perches of D° - - - 9 - D° - - - -	11/	88 — —
35.	To 120 perches of D° - - - 10 - D° - - - -	15/7	93 10 —
	To 66 perches of D° - - - 7 - D° - - - -	5/10	18 9 6
36.	To 160 perches widening and deepening preſent Stream, commencing at C and continuing to D, average 6 feet ſinking -	3/6	28 — —
	To 60 perches of Main Drain, commencing at the point D, - - - - - - - - - - - - average 7 feet ſinking -	5/10	17 10 —
	To 80 perches of D° to the Supply Drain - 8 - D° -	7/3	29 — —
	To 75 perches of D° from Canal Supply at E, 6 - D° -	3/6	13 2 6
	To 132 perches of D° to the Road to Rahen - 8 - D° -	7/3	47 17 —
	To 140 perches of D° from the Road to the Stream at Killanee - - - - - - - - - -	7/3	40 16 8
37.	To 60 perches of D° from the point H running through Derrooly Bog - - - - - - - - average 6 feet ſinking -	3/6	10 10 —
	To 40 perches of D° - - - - - - - - 7 - D° -	5/10	11 13 4
	To 120 perches of D° - - - - - - - - 10 - D° -	15/7	93 10 —
	To 80 perches of D° - - - - - - - - 9 - D° -	11/	44 — —
	To 70 perches of D° - - - - - - - - 8 - D°, and falling into Main Drain No. 32. at K - - - -	5/10	20 8 4

(*continued.*)

Eſtimate of Expenses neceſſary to execute propoſed Works in Pullough Bog, &c.—*continued.*

No. of Section.			
		s.	£. *s.* *d.*
38.	To 20 perches of Main Drain, commencing at the junction with Section No. 36.; and proceeding through Ballinacor and Newtown Bogs, average 6 feet sinking - - at	3/6	3 10 —
	To 140 perches of D° average 8 feet sinking - - - -	7/3	50 15 —
	To 32 perches of D° - - - 6 - D° - - - -	3/6	5 12 —
39.	To 183 perches of D° - - - 7 - D° - - - -	5/10	53 7 6
	To 340 perches of 8-feet Receiving Drains in Pullough and Derrycooly Bogs - - - - - - - - -	7/3	123 5 —
	To 442 perches of - - - - D° - in Oughter, &c. -	7/3	160 4 6
	To 220 perches of - - - - D° - in Killaranny Bog -	7/3	79 15 —
	To 180 perches of - - - - D° - in Ballinacor Bog -	7/3	65 5 —
	To deepening and widening the present Drain from the Barony Stream to the North side of Derrycooly, and opening a new Drain along the edge of same till it falls into Section No. 33. whole length 340 perches - - - - - - -	3/6	59 10 —
	To widening and deepening 580 perches of the Canal Boundary Drains, leaving 8 feet deep - - - - - - -	5/	145 — —
	To deepening and widening 400 perches of present Surface Drains in the Cuſh near Derrymore - - - - -	2/	40 — —
	To deepening and widening 310 perches of Road Drains at Derrymore - - - - - - - - - - -	1/6	23 5 —
	To 4,950 perches of Surface Drains in Derrycooly and Pullough Bogs, South of the Grand Canal - - - - - -	2/6	618 15 —
	To 1,000 perches of Surface Drains in Pullough Bog, North of the Canal - - - - - - - - -	2/6	125 — —
	To scouring and widening Canal Drains, 600 perches - -	2/	60 — —
	To 7,350 perches of Surface Drains in Derrycooly and Oughter Bogs - - - - - - - - - - -	2/6	918 15 —
	To 1,550 perches of D°, in Derrooly and Derrymore Bogs -	2/6	193 15 —
	To 1,000 perches of D° in Killaranny Bog - - - - -	2/6	125 — —
	To 1,300 perches of D° in Newtown Bog - - - - -	2/6	162 10 —
	To sinking and widening 300 perches of outlet Stream between Killaranny and Ross Gore - - - - - - -	3/	45 — —
	To 230 perches of Surface Drains in the small Bog of Ross Gore	2/6	28 15 —
	To sinking and widening 280 perches of Road Drains, through Ross Gore Bog - - - - - - - - -	1/6	21 — —
	To 870 perches of Surface Drains in Corunalaur and Ballinacor Bogs - - - - - - - - - - -	2/6	103 15 —
	To 520 perches of Surface Drains, in the small Bog of Derrooly	2/6	65 — —
	To widening and deepening 200 perches of outlet Stream at Newtown Bog - - - - - - - - -	3/	30 — —
	To 364 perches of proposed Road across Oughter Bog, parallel to Main Drain No. 34. - - - - - - - -	15/	273 — —
	To 784 perches of proposed Roads in Derrycooly and Pullough Bogs - - - - - - - - - - -	15/	588 — —
	To 1,148 perches of Back Drains on one side of proposed Roads	2/6	143 10 —
	Total Amount for Drains, &c. &c. - -	- £.	6,821 8 8
	Contingent and unforeseen Expenses, at £. 20. per Cent.	- -	1,364 5 9
	TOTAL for the Fourth Division - -	- £.	8,185 14 5

709

FIFTH DIVISION.

Comprehending COAGHTER, LEAMORE, BUNN, DERRYCARNEY, and KINOOR BOGS:

Containing in the whole 3,539 acres 1 rood and 14 perches.

THESE Bogs are a continuation of and adjoining the foregoing Bogs of Derrycooly and Oughter, and are pretty similarly circumſtanced, being bounded and divided by three principal outlet Streams and by the line of the Grand Canal, extending from Pullough to Macartney Aqueduct, a diſtance of about three miles. The Eaſtern Boundary is a ſtream called the Barony Stream already alluded to, and the Weſtern Boundary is the low bottom land of Derrycarney, adjoining the Frankford River, where it passes under the Grand Canal by Macartney Aqueduct. The centre outlet is a ſtream which is chiefly taken up as a supply to the Canal, the redundant water of which passes through the tunnel near the 54 mileſtone at Thurrawn. This outlet ſtream Nature has formed as the common carrier for the waters issuing from the Bogs adjoining it on both sides, but at present its communication with the Eaſt Division is cut-off by the Supply Drain of the Canal, which commencing at Gurteen Bridge is carried through Leamore Land and Bog to the Canal, varying in its diſtance from the ſtream from 10 to 100 perches, according as the levels would permit. This Supply Drain has been carried through the Bog about one mile, cutting off from the great mass about 80 acres of Coaghter Bog, lying between the Supply Drain and the natural course of the ſtream. The effect of this part of the Supply Drain, as a Catchwater Drain, is aſtoniſhing, for to its aid alone may be attributed the complete drainage of the said 80 acres of Bog; it being the receiver for all the waters issuing from the Bog between it and Coaghter Island, which from its present ſtate of wetness, keeps a conſtant run of water into the Supply Drain, evidently fed from the springs and quagmires near Coaghter Island.

This Island lies near the centre and summit of the Bog, and contains about three acres of fine manuring gravel, from which the Bog falls to the Barony Stream on the Eaſt, the Canal on the North, and the Supply Drain before mentioned on the Weſt. This Supply Drain, as represented in Section No. 43, I propose to sink and widen to the Bog Navigation size, by which the clay and gravel of Leamore may be carried into the Grand Canal, and diſtributed along its banks into Coaghter Bog. I also propose a centre line of Main Drain (see Section No. 41) from the Barony Bridge to Coaghter Island, which by taking up the Stream at said Bridge will afford irrigation to the whole surface, and eventually discharge its waters, partly into the present line of Supply Stream and partly into the Barony Stream of Pullough. It will also afford future opportunity of making cross branches of Navigable Drains to Leamore, and will amply supply them with water as far as the level will permit, by the aid of which the manuring gravels of Leabeg and Leamore may be generally diffused over the surface.

The Fifty perch Boundary Drain of the Canal I would recommend to be made a good eight foot Drain, which will effectually reduce the Bog between it and the Canal to a ſtate of consolidation.

In addition to these Drains I have laid out a centre line of eight-foot Drain in the Bog between Leamore and Coaghter Island, communicating with numerous Surface Drains, and with the Irrigation Drain No. 41, which Drain will also discharge its waters into the line of supply No. 43. These lines, which I have laid out for Drainage and Irrigation only, are not intended for future Navigation Drains, their falls being too rapid for that purpose; but ſhould it be advisable to obtain gravel from Leamore for the centre of the Bog (which I am confident would be the case when Coaghter Island is exhauſted) by cross lines of navigation, they are to be laid out on whatever levels are moſt eligible and whether they are on one or more levels, they can be all effectually supplied with water from the Irrigation Drain, No. 41, as before ſtated.

The weſtern portion of these Bogs, known by the name of Bunn, Derrycarney, and Kincor Bogs, is bounded, as before observed, by the Supply Stream from Gurteen Bridge to Thurrawn on the Eaſt, and by Derrycarney and the Frankford River on the Weſt, and contains 1,326 acres 2 roods and 13 perches, the whole surface of which is generally nearly a dead level of from 20 to 26 feet above the keyſtone of Macartney Aqueduct; the adjoining lands are under the surface of the Bog, and the surface water at Gurteen Bridge is only 14 feet 7 inches higher than the said keyſtone, and it is from 10 to 12 feet under the general surface of the Bog, which precludes the possibility (at any reasonable expense) of using the Stream at Gurteen Bridge as an Irrigation Supply. It might however be taken up between Gurteen Bridge and Lough Boura; but if that was done, the object of draining the Lake would be defeated. In such a case, where irrigation is not within the compass of moderate expense, we muſt be careful not to exhauſt by drainage such moiſture as may be necessary to promote vegetation, and taking care in dry summers to dam up the Main Drains with a few sods at proper levels.

On the verge of this Bog, and nearly parallel to the ſtream from Gurteen Bridge, there is at present a long line of Drain running from near Gurteen Bridge to the boundary Drain of the Grand Canal, for a diſtance of a mile and a half through the Red Bog, cutting off from the great mass above 150 acres, on which it has produced the same extraordinary effects in Drainage as the supply drawn at Thurrawn. This Drain falls the whole way from the Road near Gurteen Bridge to the Canal Drain at Thurrawn, into which, and other cross outlets to the ſtream, it discharges its waters; in consequence of which I propose to widen and deepen it as a Main Receiver for a great portion of the surface Drainage. In addition to this Drain I have also to recommend a deep Main Drain, carried up in a line of a present Drain from the Frankford River, towards a fine grazing cuſh in the centre of the Bog, from which point it is proposed to continue the said Drain through a long vale of springs and swallow-holes, until it falls into the long Receiving Drain before mentioned.

The Fifty perch Drain of the Canal may also be converted into a Receiving Drain, by which the whole of the Bog will be nearly surrounded by main outlets for the surface waters.

On the subject of Manures, I am sorry to say these Bogs are not so favourably circumſtanced in that particular as moſt of those I have hitherto mentioned, nor is there a capability of introducing Navigable Drains at a reasonable expense in this Bog, to convey the manures from the exterior; Roads alone can be resorted to, and I have every reason to apprehend that the reclaiming of this Bog will be attended with peculiar labour and expense.

In the centre of Coaghter and Leamore Bogs, the only resource for manure is the small Island of Coaghter, which in the event of general improvement muſt soon be exhauſted; the supply muſt then come from the exterior verges, and is chiefly confined to the south side at Leamore, where there is abundance of limeſtone and manuring gravel. On the north side no such materials are to be had, except such as may be brought by means of the Grand Canal, and deposited along its banks; the eaſt side may be supplied with a portion of limeſtone and gravel, to be found along the Barony Stream, and the weſt side will be supplied by the proposed Navigable Drain to the Grand Canal. It muſt not, however, be expected that the benefit of those resources can advance quickly into the interior of this Bog, which is for the moſt part a mile and a half in breadth, and above two miles in length. Along the lines of navigation and the verges, where a supply of manures is to be had, the progress of improvement will keep pace with the means, and will every day lessen the difficulty of access to the interior, which although not actually under agricultural improvement, will nevertheless be a desirable acquisition to the surrounding Farmers, by furniſhing them, when drained, with an extensive run for young cattle, which will not only ameliorate the soil, but will in time produce a grassy surface.

Bunn, Derrycarney, and Kincor Bogs, are equally, if not more deſtitute, of convenient manuring gravel, there being no supply in the centre, and very little on the verges, except at Derrycarney; and even here the supply is indifferent, it being chiefly a low moory soil lying under the general surface of the Bog. However, notwithſtanding all these discouraging circumſtances, the Bogs, by being made accessible for cattle at all seasons, would, inſtead of being ſhaking quagmires, become useful grazing Bogs, that every year would be advancing into a profitable ſtate, and which by the aid of lime, and such compoſt as can be obtained, would be at length reduced to agricultural purposes. And therefore, with this view of the subject, I have given the following Eſtimate of the Expenses which I conceive necessary to effect the Drainage of this Diviſion of the Diſtrict.

ESTIMATE of EXPENSES necessary to execute the proposed Works on the Bogs of COAGHTER, LEAMORE, BUNN, DERRYCARNEY, and KINCOR Bogs.

No. of Section.					
		s.	£.	s.	d.
41.	To 276 perches of Irrigation Drain, from the Barony Bridge to Leamore, average 5 feet sinking - - - - - at	3/	41	8	—
	To 200 perches of Main Drain in continuation of the above, through Leamore and Coaghter Bogs, average sinking 9 feet	11/	110	—	—
	To 320 perches of D° - - - - - - - - - - - - 10 feet	15/7	249	6	8
	To 30 perches of D° - - - - - - - - - - - - 8 feet	7/3	21	—	6
	To 80 perches of deepening and widening the Fifty perch Drain of Canal - - - - - - - -	3/	12	—	—

Eſtimate of Expenses neceſſary to execute propoſed Works on Coaghter Bog, &c.—*continued.*

No of Section.		s.	£.	s.	d.
42.	To 200 perches of Main Drain, running from Coaghter Island towards Thurrawn, average 9 feet - - - - - -	11/	110	—	—
	To 72 perches of deepening and widening the Canal boundary Drain to Thurrawn - - - - - - - - -	3/	10	16	—
43.	To widening and deepening the Supply Drain from Thurrawn into Leamore, for 360 perches, making it a Navigation 14 feet wide at bottom and 4 feet water, average additional excavation 74 yards to the running perch - - - - - -	4*d.* per yd	444	—	—
	To 360 perches of back Drain on one side - - - - -	2/6	45	—	—
	To dressing Banks and forming Trackways on both sides, 720 perches - - - - - - - - - - - -	5/	180	—	—
	To building a Bridge at the junction of said navigable Drain with the Grand Canal - - - - - - - -	- -	250	—	—
	To 496 perches of 8-foot Drain, parallel to the Barony Stream	7/3	179	16	—
44.	To deepening and widening 110 perches of Main Drain, from Derrycarney along the Cuſh towards the interior of the Bog -	1/6	8	5	—
	To 23 perches of Main Drain, commencing at said Cuſh and proceeding towards the centre of the Bog along a line of subterraneous waters and swallow-holes, average 8 feet sinking -	7/3	8	6	9
	To 40 perches of Do - - - - - - - - 11 - Do - at	18/2	36	16	8
	To 120 perches of Do - - - - - - - - 10 - Do - -	15/7	93	10	—
	To 40 perches of Do - - - - - - - - 9 - Do - -	11/	22	—	—
	To 27 perches of Do - - - - - - - - 8 - Do - -	7/3	9	15	9
	To 320 perches of 8-foot receiving Drain in Leamore Bog -	7/3	116	—	—
	To deepening and widening 320 perches of the Fifty perch Boundary Drain in Coaghter Bog - - - - - - -	5/	80	—	—
	To deepening and widening 300 perches of the Land Drains on the Bog edge at Leamore - - - - - - -	3/	45	—	—
	To deepening and widening 440 perches of the Twenty perch Drains, to six feet deep - - - - - - - -	3/	66	—	—
	To 6,400 perches of Surface Drains in Coaghter Bog - -	2/6	800	—	—
	To widening and deepening 880 perches of the Fifty and Twenty perch Drains in Kincor Bog, making them eight feet deep -	5/	220	—	—
	To deepening and widening 480 perches of present Drain running parallel to the Gurteen Stream, making it a complete 8-foot Drain - - - - - - - - - -	5/	120	—	—
	To 480 perches of 8-foot Drains in said Bog - - - -	7/3	174	—	—
	To 240 perches of - Do - In Derrycarney Bog, and falling into Main No. 44. - - - - - - - -	7/3	87	—	—
	To 240 perches of 8-foot Cross Drains, falling into the Fifty perch Canal Drain - - - - - - - - -	7/3	87	—	—
	To 4,000 perches of Surface Drains in Derrycarney and Kincor Bogs - - - - - - - - - -	2/6	500	—	—
		£.	4,127	1	4
	Contingencies and unforeseen Expenses, at £.20. per Cent.	- -	825	8	3
	TOTAL EXPENSE for Fifth Division - - -	- £.	4,952	9	7

SIXTH DIVISION:

Comprehending GILLEN, CLOGHAN, and LUMCLOON BOGS,

1,895 Iriſh. Containing in the whole 3,069 acres 2 roods 14 perches.

THESE Bogs are ſituate on each side of the Road from Gillen to Frankford for near two miles; the eaſt side of the Road is composed of an extensive tract of deep Bog, wet and ſhaking, containing 1,320 acres 27 perches, unbroken by any intereſting feature, and completely in its original ſtate of nature. It is bounded by the Grand Canal from Macartney Aqueduct to Gillen Bridge, and the summit of the Bog is 33 feet above the keyſtone of the Aqueduct, which is the great point of ventage for this and the adjoining Bogs.

The weſt side, containing 1,749 acres 1 rood 27 perches of Bog, is an extent of pretty much the same description, except that it is interſected by a ſtream from Killourney to Lumcloon, along which there is a fine line of grazing Cuſh and Black Bog that would produce good aſhes. The whole of this portion of the Bog is commanded by the springs of Cloghan and Killourney, from which there are conſtant running ſtreams, but in consequence of not having sufficient vent, the waters make their way in all directions through the Bog, appearing and sinking in several places, particularly along the line and on the summit of the ſtream to Lumcloon; and it is a remarkable circumſtance that the higheſt points of the Bog are the wetteſt (another proof of the retentive nature of soft Red Bogs) so much so, that the summit of it, which is near the town of Cloghan, and neareſt the great head of springs under the high lands, is so wet as to render it unfit even for the purposes of fuel; and it is also extraordinary that the little turf that is made is formed of the firſt spit of the Bog, which in almoſt all other Turbary Bogs is ſtripped off the banks as useless: but the fact is, that from the abundant supply of spring water, the under ſtrata of the Bog are in a liquid ſtate, and so cold that it is impossible to ſtand turf cutting even in the hotteſt summer; nor are the internal Cross Drains made in the usual way of the leaſt use, inasmuch as they are unequal to the cutting off the conſtant supply from the hills. There is however a good line of Drain lately made for a part of the way under the north side of Cloghan Hill, which if widened and sunk, the whole diſtance would be of considerable advantage as a Catchwater Drain, and which is one of the objects I recommend to your consideration. Indeed it is extraordinary that something of the kind has not been done long since by the proprietor, which would enable the tenants of Cloghan to cut turf there, inſtead of being driven to a greater diſtance for that necessary article. I have more than once seen a man making turf where the Bog was 15 or 16 feet deep, yet such was the force of the under water, that he could not raise a second spit of the turf.

To remedy this evil I propose, among other improvements, to widen and deepen the present Drain under Cloghan Hill, and to sink the Weſtern Road Drain from Cloghan to Killourny, and to carry the same round the Lands of Killourny till it discharges into the Stream at Ballyſhiel.

In the Eaſt Division of the Bog I propose a Main Drain commencing at the road to Frankford, and carried along a present Drain into a line of green Cuſh, where the natural falls of the Bog on both sides are united. This Main Drain will fall into the back Drain of the Canal, to which it will have a fall of 20 feet, and from thence to Macartney Aqueduct, as described in Section No. 45. I also propose another Main Drain commencing at the Frankford River 50 perches above the Aqueduct, and directed along a present Drain to near the summit and centre of the Bog; where the accumulation of water is so great, that it always supplies a conſtant ſtream this way. At the end of this Drain I propose to terminate a long line of Navigable Drain, which I have laid out from the foot of the hill at Cloghan through the centre of these Bogs for a diſtance of two miles and a half, as represented in Section No. 49; by means of which manuring gravel of the beſt quality can be brought from Cloghan Hill into the moſt inaccessible part of the interior of the Bog until it comes to the Road from Gillen to Frankford, which it is proposed to cross, and may continue to the summit of the Eaſt Division, where it will connect itself with the Main Drain from the Frankford River, which also forms part of Section No. 49.

The Road Drains from Gillen towards Frankford are also proposed to be deepened and widened, particularly the Weſt side, in order to carry off the springs by which it is annually inundated. The waters of this Weſtern Road Drain will fall both ways, discharging southward to Lumcloon Stream, and northward towards Gillen, and under the Canal through the Tunnel at Falsk, as described in Section No. 46. The next object which I beg leave to recommend to your consideration is the improvement in the falls of the ſtream issuing from and near the summit of Killourny Bogs, and falling into the Frankford River near Lumcloon Bridge. This ſtream is evidently fed from the great springs of Cloghan and Killourny, which, after making their way through various subterraneous passages, make their appearance in the centre of those Bogs at the point A, below which it assumes the shape of a regular ſtream, and continues to increase till it falls into the Frankford River. From near this point of junction I propose to deepen and widen the course of the ſtream up to the Bridge on the Frankford Road, where the ſtream will be lowered five feet, according to Section No. 47. From thence it is ſtill continued deepening and widening to the great head of springs near Killourny, to which it is necessary to give full and ample ventage, and for which purpose I propose to go to the clay and gravel at that point by a sinking of 15 feet; from this point the course of the Drain is directed ſtraight to the old church of Killourny, till it intersects the Road from Cloghan to Firbane, where it will receive the chief springs between said old church and Cloghan, by communicating with the Drains Eaſt and Weſt of the Road. The whole fall of the proposed Drain from the Road at Killourny to the Frankford River near Lumcloon Bridge, will be 39 feet in a diſtance of 875 perches, which appears by Section No. 47. From the point A, I also propose a central Main Drain through Gillen Bog, running up to near the turf banks of Kyledotha. This Drain will be 260 perches long with a fall of 20 feet into the Cloghan Stream, as described in Section No. 48.

These Drains, it is hoped, will give complete vent to the accumulation of waters with which these Bogs are overcharged, and by breaking and cutting off the communication of the subterraneous ſtreams, the Bog will be reduced to such a ſtate of consolidation that the operation of cutting the Navigable Drain will receive little or no interruption from the internal springs of the under ſtrata, which otherwise would be so powerful, that the excavation of it would be a very difficult and expensive undertaking; indeed, without such preparation, I will venture to say it would be impossible to effect any line of Navigation through those Bogs, and which is fully evinced by the difficulty which occurred in the execution of the Grand Canal on the borders of these very Bogs.

The Twenty and Fifty perch Drains of the Canal ſhould be widened and sunk, the former to six feet and the latter to eight feet in depth, into which the course of many of the Surface Drains are directed. It is also necessary to scour and deepen all the present Drains, particularly the Road Drains from Killourny Pipe to the Pipe at Kyledotha, and on each side the Road to Ballyſheil, which, with the Surface Drains marked on the Map, I truſt, will be sufficient to accompliſh the desired object.

In these Bogs, which are about a mile and a half wide and three miles long, there are not any internal resources to further agricultural improvements, by manuring gravel or limeſtone, and therefore the centre navigable line is indispensibly necessary to afford the means of diffusing the benefit of such manures over the whole surface of the Bog, without which they cannot possibly (at any reasonable expense) be conveyed to the interior; and I am convinced, that if this line was accompliſhed, the benefits resulting from it would be sufficiently obvious to induce the extension of water carriage, by numerous collateral cuts carried as far on both sides as the levels would permit, all of which would be amply supplied with the beſt manuring gravel and limeſtone both at Killourny and the Hill of Cloghan, which are the only convenient situations where such materials can be had along the verges of these Bogs, and of which it is scarcely an eighth part of its circumference.

The proprietors of these Bogs are the Earl of Ross for Lumcloon part, the Right Hon. Dennis Bowes Daly for Cloghan, and Samuel Judge and William Armſtrong, Esqrs. for Killourny, Kyledotha, Flark, Gillen, &c.

The bounds of Mr. Daly's part have been laid out, but all the reſt have not been ascertained, as far as I could learn.

ESTIMATE of Expenses necessary to execute the proposed Works on the BOGS of GILLEN, CLOGHAN, and LUMCLOON.

No. of Section.					
		s.	£.	s.	d.
45.	To 25 perches of Main Drain from the Cloghan Road through Cuſhwaheen, average 8 feet sinking - - - - at	7/3	9	1	3
	To 160 perches of D° - Average 10 feet sinking - - -	15/7	124	17	4
	To 70 perches of D° - - D° 9 - D° - - -	11/	38	10	—
46.	To widening and deepening 414 perches of the Weſtern Road Drain from near Gillen Bridge to the Stream at Lumcloon, average sinking 9 feet - - - - - - -	11/	227	14	—
47.	To 347 perches of new course for the Stream at Lumcloon, commencing at the Foot Stick behind Gynan's house, and continuing up to the Bog Road, average 6 feet sinking and 4 feet bottom - - - - - - - - - at	6/	104	2	—
	To 80 perches of D° - Average 8 feet sinking and 3 feet bottom above the Road - - - - - - at	7/3	29	—	—

(*continued.*)

Eſtimate of the Expenses for the Bogs of Gillen, Cloghan, and Lumcloon—*continued.*

No. of Section		s.	£.	s.	d.
	To 78 perches of New Course for the ſtream at Lumcloom, commencing at the Foot Stick behind Gynan's house and continuing up to the Bog Road, average 12 feet sinking - - -	24/6	95	11	—
	To 158 perches of D° - D° 15 - D° - - - -	40/	316	—	—
	To 76 perches of D° - D° 14 - D° - - - -	32/	121	12	—
	To 84 perches of Main Drain, average 12 feet sinking - -	24/6	102	18	—
	To 52 perches - D° - D° - 10 - D° - -	15/7	40	10	4
48.	To 40 perches of Main Drain commencing at A, and proceeding towards Gillen, average 15 feet sinking - - - -	40/	80	—	—
	To 60 perches of D° - Average 14 feet sinking - - -	32/	96	—	—
	To 80 perches of D° - - D° 12 - D° - - -	24/6	98	—	—
	To 80 perches of D° - - D° 10 - D° - - -	15/7	62	6	8
49.	To 71 perches of Main Drain commencing near the Aqueduct and running to the end of Navigation Line, average 6 feet sinking - - - - - - - - - - -	3/6	12	8	6
	To 80 perches of D° - Average 8 feet sinking - - at	7/3	29	—	—
	To 86 perches of D° - on the Navigation size, 14 feet bottom and 4 feet water, average 10 feet sinking - - - -	37/	159	2	—
	To 80 perches more of said Navigable Drain, average 12 feet sinking - - - - - - - - - - -	60/	240	—	—
	To 40 perches of D° - to the Bog Road, average 10 feet sinking - - - - - - - - - - -	37/	74	—	—
	To a wooden Bridge across the Road 15 feet wide and 30 feet long - - - - - - - - - - -	- -	50	—	—
	To 139 perches of said Navigation, average 8 feet sinking -	28/	194	12	—
	To 80 perches of D° - - - - D° - 8 - D° - -	28/	112	—	—
	To 40 perches of D° - - - - D° - 10 - D° - -	37/	74	—	—
	To 60 perches of D° - - - - D° - 8 - D° - -	28/	84	—	—
	To 40 perches of D° - - - - D° - 11 - D° - -	56/	112	—	—
	To 80 perches of D° - - - - D° - 12 - D° - -	60/	240	—	—
	To 104 perches of D° - - - - D° - 11 - D° - -	56/	291	4	—
	To 1,498 perches of Back Drains to proposed Canal - -	2/6	187	5	—
	To dressing Banks and forming Trackways on both sides, 2,996 perches - - - - - - - - - at	5/	374	10	—
	To deepening and widening 460 perches of Catchwater Drain under Cloghan Hill - - - - - - - - -	5/	115	—	—
	To deepening and widening 760 perches of the Canal Fifty and Twenty perch Boundary Drains, leaving them 8 feet deep -	5/	190	—	—
	To 640 perches of 8-foot Drains in Lumcloon Bogs - - -	7/3	232	—	—
	To 480 perches of D° - - - along the edge of Killourny and along the Weſt side of the Road to Cloghan - - - -	7/3	174	—	—
	To scouring and sinking the present Road Drains in Ballyshiel and Killourny Bogs 480 perches - - - - at	1/6	36	—	—
	To 400 perches of Surface Drains in Ballyshiel Bog - -	2/6	50	—	—
	To 4,500 perches of Surface Drains in the Bog of Falsk and Lumcloon - - - - - - - - - at	2/6	562	10	—
	To 4,500 perches of Surface Drains in the Bogs of Cloghan and Gillen - - - - - - - - - - -	2/6	562	10	—
		£.	5,702	4	1
	Contingencies and unforeseen Expenses, £.20 per cent. -	- -	1,140	8	10
	TOTAL Expense for Sixth Division - -	- £.	6,842	12	11

SEVENTH DIVISION,

Comprehending LOUGH BOURA, and BEANAMUCK BOGS:

Containing in the whole 8,586 acres 3 roods.

5,301 Iriſh.

THESE extensive Bogs are undivided by Nature, except by the few ſtreams issuing from them, and which are of little importance until they flow from their verges. They are bounded on the north by the Road from Tullaghmore to Cloghan, on the south and eaſt by the high lands in the neighbourhood of Frankford, and on the weſt by the Frankford River, extending in length to the eaſt from said River a diſtance of five Iriſh miles in a bird line, with an average of two miles in breadth, in the interior of which there are some intereſting features, particularly Lough Boura; this Lake, which lies in the centre of the Bog, to which it gives its name, contains 108 acres, the whole of which is so ſhallow that a man may wade through every part of it in summer time, but in the winter season it rises much higher, owing to the Bog having a natural declination to it; in consequence of which it is the great receiver for all the surface waters of the surrounding Bogs, which are slowly discharged by the ſtream to Gurteen Bridge, where it is taken up as one of the supplies to the Grand Canal (as described in Section No. 43.)

The fall from this Lake to Gurteen Bridge is 8 feet in a diſtance of about one mile, the ſtream falling the whole way in a paſturable vale, where there are many spots of fine limeſtone gravel, which will be a valuable acquisition in reclaiming the Bog on both sides. Along this vale, from Gurteen Bridge to the south end of Lough Boura at A, a diſtance of a mile and a half, I propose to bring up a Navigable Level, the bottom of which will be 12 feet under the present surface of the Lake, and 7 feet 8 inches under the keyſtone of said Gurteen Bridge. This Navigable Drain will not only effectually tap Lough Boura, but will also provide, in the excavation, the means of reducing it to meadow and paſture ground, which from the beſt information I can collect, has been long in contemplation by the late proprietor Doctor Daly, and were it not for his death would have been carried into effect long since. The bottom of the Lake is composed of fine Black Bog and gravel, great quantities of which would be raised by the Canal Drain, and by spreading it over the remainder of the surface, 108 acres of useless water would be converted into meadow and paſture grounds. The lowering of this Lake would not at all reduce the supply of water to the Grand Canal, as the sources from which it is fed would ſtill retain their influence, and more particularly as the chief supply ſtream is not connected with the Lake (as generally supposed) but is a ſtream rising in and about Beanamuck, and falling into the Lough Boura ſtream within a few perches of Gurteen Bridge, which laſt will be considerably increased by the acquisition of the springs of Derrydorney, which, by the proposed improvements, are intended to be turned this way by the Navigation Line No. 54, after having served the purposes of canal and irrigation supplies.

From the south end of Lough Boura, where the navigable cut is proposed to terminate at A, I recommend a continuation of Main Drain to get under the springs of Broughall, and ending near the Frankford Road at B, according to Section No. 51. The next improvement connected with Lough Boura, which I mean to recommend, is a Tap Drain brought up from the loweſt point of ventage at Lumcloon Bridge, as described in part of Section No. 50. The immediate operations of this Main Drain will not be more than any other Main Line; but it is, however, so circumſtanced, that it will admit of any future sinking, even to the under ſtrata of the whole of those Bogs.

In the firſt inſtance it is proposed to have a saddle fall both to Lumcloon and Lough Boura, where it will discharge into, and form a branch of the Navigation Line.

The remainder of the Bog, weſt of the Lake, chiefly falls towards it as an inclined plane, through which I have laid out various lines of 8-foot Receiving Drains, all of which, with the Surface Drains connected with them, will eventually discharge their waters into the Navigation Line. In extension of the Line No. 50, I propose to continue it ſtraight across Lough Boura, intersecting the Navigation Line No. 51; and this line, for so far as it passes through the present bed of the Lake, I also intend to be made navigable, in order that the manuring gravel and limeſtone of Leabeg may be diffused on each side, and at the extreme points of the Lake for the benefit of the surrounding Red Bog, into which it is impossible for manuring gravels to be conveyed by any other mode whatever, except at such an expense as would out-balance any future prospects of return. From the eaſt side of the Lake the Main Drain is proposed to run towards Bouraun Island for a diſtance of 74 perches to the point C, where it intercepts a line of subterraneous springs, and at which point the Drain is directed towards the Island of Beanamuck for 240 perches to D, where it forms a junction with a branch of the Main Drain No. 53 (after passing under the proposed Road from Barnaboy to Leabeg, a part of which has been laid out for many years.) From D, the Drain is proposed to take a central course through Beanamuck and Ballybracken Bogs, &c. to Mr. Delany's Tap Drain at Derrydorney; the waters of which being a conſtant ſtream are proposed to be taken up as a supply to a future line of Navigation Drain, as represented in Section No. 50.

The Bog Road, as before ſtated, has been partly laid out these many years, with a view to open a communication between the towns of Frankford and Clara, the Ditches and Drains of which were made as far as the point E, near Bourawn Island; but owing to the extreme bad ſtate of the Bog, and the want of due preparation, the project was abandoned. I am, however, of opinion that it would be advisable to open this line of Road, by which the diſtance from Frankford to Leabeg would be ſhortened *three* miles in *six*, independent of the advantage of conveying lime and manuring gravels from Broughall, Leabeg, and Bourawn Island, into the interior, from any of which points it don't exceed three quarters of a mile; and although I do prefer it to a Navigation Line, yet in this case I recommend it for the sake of opening a communication between two counties that are at present cut off from each other by an extent of Bog almoſt inacceſsible. The levels of this line of proposed Road are represented in Section No. 52, which also describes the levels of the line of Main Drain connected with it. The present Drains on each side the Road from Barnaboy to where it intersects the Main Drain No. 50, are proposed to be widened and deepened to the average of 6 feet sinking; from that point of intersection to Leabeg the Bog is actually a ſhaking quagmire full of holes, floating islands and duck-pools, having from 4 to 6, and even 7 feet water, to which ample ventage muſt be given before any operations could be carried into effect; for this purpose I propose two parallel Tap Drains (according to Section No. 52.) twenty perches asunder, and between them I would recommend the continuation of the Road to Leamore; these Drains will fall into the present line of ſtream at Leabeg, which, when deepened according to Section No. 53, will be capable to receive their waters, even ſhould they be sunk to the under ſtrata, which being chiefly composed of impervious blue clay, in addition to the retentive nature of the Bog, is the reason of its excessive wetness. Into these Tap Drains considerable lines of Surface Drainage will be directed, which, with the Navigation Line No. 51, and the Tap No. 53, will, it is hoped, have due influence in lowering and consolidating the surface of the Bog between Beanamuck and Lough Boura. In the Bog of Kilnagull and Ballybracken, &c. I have laid out two long lines of 8-foot Receiving Drains, falling with the natural declination of the Bog into the present Main Carrier at the foot of those lands, and which is an excellent vent to the springs of Derrydorney, where it operates as a complete Catchwater Drain. With these lines of 8-foot Drains I have connected numerous Surface Drains, as marked on the Map, all of which, by communicating with the Navigation Line No. 50, will receive from it ample supply of water for irrigation.

To the Bog on the weſt side of Beanamuck, comprizing near one half of this Division, I ſhall now beg to draw your attention. This Bog is the chief source of the supply ſtream to Gurteen Bridge, and also to the ſtream passing under the Barony Bridge into Leamore and Derrycooly Bogs. Where these ſtreams make their appearance, the mass of Red Bog is broken by a line of paſturable cuſh, very favourable to agricultural improvement, being generally composed of sedgey Black Bog, which would produce ſtrong aſhes. The chief of these favourable lines is that in which the Main Drain, No. 53, is proposed to run; and also the Branch Main connected with it, running from the point D, near Beanamuck, and continuing down the present line of ſtream towards Leabeg. Another line of subterraneous ſtreams and cuſh is also connected with said Drain near the Bog Road from Leabeg to Beanamuck, where (by having the level of the vent and summit ascertained) I have laid out a line of 8-foot Drain, which will be connected with the Navigation Line, No. 54, in a favourable point to receive its redundant waters. Between this line of 8-foot Drain and Leabeg I have also laid out another 8-foot Drain, about a mile long, and in a higher level of the Bog, which will discharge its waters into the common outlet ſtream near the Bog Road at Beanamuck; and I have deemed it advisable to lay out another Receiving Drain in the cuſh, running from the south end of Beanamuck to Derrydorney, and near the weſt side of the Island of Derracheeragh. The remainder of the cuſhes are formed by the ſtreams running to the Barony Bridge, and in part of which the Line of Main Drain, No. 55, is proposed to run.

To these internal capabilities for improvement may be added the Islands of Beanamuck, Derracheeragh, Coins Island, and Gamble Derry, containing above 100 acres, composed of clay, gravel, and moor, the neareſt of which is above a quarter of a mile from the main land; Beanamuck, although by much the greateſt portion of those Islands (being above 80 acres) has by far the loweſt surface, and is considerably under the general level of the Bog, in consequence of which little is to be expected from it as a supply for manuring gravel: Gamble's Derry is small and insignificant, but Deeracheeragh and Coins Island, containing about twenty acres, are fine high hills, affording abundance of those articles so necessary for reclaiming these Bogs.

In the lands of Derrydorney, opposite the Islands before-mentioned, are also plenty of the like materials, and a number of conſtant ſtreams and springs issuing from them, which being on the summit of the Bog, has induced me to provide means for the introduction of them into the interior for the purposes of irrigation, and to supply a Navigable Cut for the conveyance of those gravels into the heart of the Bog. This Navigable Line having firſt operated as a Main Drain, is proposed to run from F, at Derrydorney (where it takes in the ſtreams before-mentioned) by G, H, and I, at the Road from Cloghan to Tullamore, a diſtance of two miles and thirty-one perches, as described in Section No. 54. The greateſt sinking for this Navigable Drain under the *present* surface of the Bog does not exceed 18 feet; but which, calculating what effects the Drainage may produce in lowering the surface, will perhaps not be above 10 or 12 feet in the deepeſt part, the greater portion of the Line of Navigation will not exceed 8 feet sinking, and in this part the Bog will not subside in the same proportion (being ſhallow) and therefore the surface water will be above two or three feet under the surface of the Bog on both sides. When irrigation is found necessary, a head of water can be raised and turned into the Back Drains of the Canal, from thence to all the Main and Surface Drains with which it is connected on both sides.

At the point H, near the centre of this Navigable Line, I propose a Cross Road running from said Navigation towards the Bog Road at Beanamuck, for a diſtance of near a mile, and also running from said point to the Road near Derrymore Mill, for something more than another mile; this Cross Road will open a longitudinal communication from Derrymore to Beanamuck and Leabeg, by which the manure may be carried on either side from the Navigable Cut.

Connected with this Navigation, at the point G, commences the line of Main Tap Drain, brought up from the rivulet near Gurteen Bridge, the course of which it is proposed to improve by deepening and widening the ſtream from near Gurteen Bridge to the Bog Road at Beanamuck, where it will be sunk six feet lower than its present bed, from whence it will be continued to G, on an average of 12 feet sinking below the present surface, by which the ſtanding pools near the summit, that are now from 5 to 7 feet deep, will be effectually tapped; a part of this line may also be converted into a Navigable Drain, branching from and connected with the Line No. 54. The next and laſt general Line of Main Drain No. 55, which I propose in those Bogs, is a Tap carried up from the Barony Bridge along a line of cuſh and springs in Bunkeeran Bog to the point K, and from thence to Gambles Drain at the point I, where it is proposed to be sunk 5 feet, and along which it is continued to M; the Drain is then directed under the lands of Killohey and Derrydorney, in order to intercept the springs issuing from these lands, which, at the time I viewed them were so ſtrong that they boiled up from the bottom of the Drain with uncommon force: this Drain will end at F, where the Navigation Line commences, and will receive all the surface waters between Coins Island and Gambles Derry, and the main land.

In the division of Bog between this Main Drain and the Line of Navigation No: 54, I have also laid out a long line of 8-foot Drain, commencing at Gambles Derry and falling into the Main Tap Drain at the point K, with a fall of 17 feet, and in the small Bog of Bunkeeran, containing 259 acres, I have also laid out two lines of 8-foot Drains, one forming the south side of the proposed Road, and the other at right angles with it, running towards the lands of Garbally.

The Bogs of Lumcloon and Derrybratt, situate between the Frankford Road from Fearbane and the River near Lumcloon, are the weſtern extremity of this great Division of the Diſtrict, and contain 541 acres, the whole of which falls entirely from said Road to the River, as appears by Section No. 56, which I have drawn merely to ſhew the general declination of the Bog from eaſt to weſt. In this Bog, which has ample fall on all sides, I have not deemed it necessary to bring up any Tap Drain or expensive deep sinking; but have subdivided it by four 8-feet Receiving Drains, into which the Surface Drains are directed. Between the verge of this Bog and the Frankford River there lies a considerable tract of paſture, which is not only flooded in winter by the River, but has been subject to be kept in continual swamp by the Bog water flowing over it. To remedy this evil, the proprietors of the adjoining lands have run a long line of Catchwater Drain between the Bog and land, by which the paſture below it is now completely dry, although from want of attention it is nearly choaked up in many places; this line of Verging Drain I would also propose to make a complete Receiving Drain, on an average 6 feet deep, with proper ventages into the Frankford River, which, with the Surface Drains, is all I think necessary to recommend for this Bog.

The grazing Black Bogs of Derrymore, Coolnarny, Lowertown, and Garbally, containing 272 acres, are adjoining the before-mentioned Bog of Bunkeeran, being separated only by the Road from Garbally to the Mill of Derrymore. These Bogs are now rented at a low rate, the surface of them being in a continual swamp by the springs of Lowertown, which are kept up as the supply for Derrymore Mill, and which continually scald the surface, chiefly composed of a dead, flat, *marly soil*, the nature of which is such, that when soaked with water, it produces a sour and unwholesome grass, particularly injurious to milch cattle. I am however of opinion, that by taking down the fall of Derrymore Mill (which now only produces £.50. per annum) and carrying up a Tap by the present Mill Race to the Hills of Lowertown, the springs there might be effectually intercepted, thereby increasing the value of the grounds to five times as much as the Mill produces. This, I conceive, may be a subject well worth consideration at a future day, particularly as there are other sites where Mills may be erected, lower down on the Barony Stream. However, as this may be a subsequent improvement, and that I do not find the lowering of those ſtreams would affect the actual *undrained Red Bogs* under consideration, I ſhall not take the expense into Eſtimate, but confine myself to the object of draining these immense tracts of ſhaking Red Bog and Quagmire only.

With respect to Manures to be found in the vicinity of these Bogs, the whole country on the north and south abound with excellent limeſtone and manuring gravel, which, by the aid of the proposed Navigable Drains, may be very generally diffused over the surface;

but the internal resources are small indeed, and chiefly confined to the Islands of Boniaurn, Derrachceragh, and Coins Island, the benefits of which, in the event of general improvement, could only be extended to the parts in their immediate vicinity. In Beanamuck and Bunkeeran, which are the principal internal grounds, very little of the kind is to be had, being both low and moory, the fiſt considerably under, and the second scarcely above the general surface of the Bogs.

Irrigation is attainable for almoſt the whole of these Bogs from the springs of Killohey and Derrydorney, which, by means of the Lines of Navigation Nos. 50 and 54, may be turned into the chief points of the Receiving and Surface Drains.

On the subject of Improvements already effected on the actual Red Bog, little or nothing has been done; there have however been accompliſhed some useful lines of Drains, by which the adjoining lands have been materially benefited, the chief of which are those Drains made by Mr. Gamble running from Killohey to the Barony Stream, whereby he completely tapped the springs of those high lands sufficient for the purposes he had in view, but not adequate to effectually cut off their communication with the Red Bogs adjoining; it is however a judicious line of Drain, and if sunk according to the proposed depths, as described in Section No. 55, will, it is hoped, fully answer the expectations to be derived from such improvements. Many other lines of Drains have been made by the late Doctor Daly, of Caſtlewood, particularly sinking the bed of the ſtream from Lough Boura to Gurteen Bridge, by which he lowered the Lake several feet, so much, that at the time it was completed, he actually run a Drain through the bed of the Lake, nearly in the direction of the line of Section No. 51. In addition to this work, he laid out several long lines of Drains in the Bogs of Broghall and Caſtlewood, particularly two long lines from the point B, the fiſt to the Lough for a mile, and the second to the Frankford River for a mile and a half; but these Drains not being laid out judiciously, or sunk to the proper depth, are now for the moſt part rendered inefficient. There are however two good lines of double Drains, done evidently with a view of planting between them, and laid out from Derrybrat to the vale of subterraneous ſtreams and gullyholes near Broghall, and along which I propose two eight-foot Drains falling with the natural declination of the Bog into the line of Main Drain No. 51.

Title and Boundaries.—The chief proprietors of those great tracts of Bog are, the Earl of Ross, Counsellor Mullock, and Mr. Conrahy, on the north side, in the Barony of Garrycaſtle; Mr. Fitzsimmons, Mr. Drought, Mr. Delany, and Mr. Gamble, on the south side, in the Barony of Ballyboy. Of the precise extent of each person's claim there is no certainty, nor have I heard of any intention on the part of the proprietors to subdivide it; indeed so little has it been thought of, that the bounds between the Baronies above-mentioned running through those Bogs for five miles have not yet been ascertained, except in very few inſtances. If this great line was once determined, it would facilitate the subdivision of the property on both sides, which can never be done till all the parties join in making one general partition of the whole, of which Counsellor Mullock would have by much the greateſt proportion. However, this partition, although necessary, is not likely to be carried into effect until some great public measure, such as that in which I have now the honour to be engaged, ſhall increase the value of the Bog in common, and then the parties will not be likely to concede to each other, but dispute inch for inch, that property to which they now pay so little attention. There are however many Drains run from the lands towards the centre of the Bog intended as boundaries, but which, on an equitable division of it, would be found to have taken a wrong direction in almoſt every inſtance; it may therefore be said, that the whole of this very extensive tract is Bog in common to the adjoining proprietors, and therefore, without attending to the private views of the parties, I have made out the following Eſtimate of the Expenses which I conceive necessary to reduce the whole to a ſtate fit to receive agricultural improvements.

ESTIMATE of Expenses necessary to execute the proposed Works on the Bogs of Lough Boura and Beanamuck, &c.

No. of Section.	——				
		s.	£.	s.	d.
50.	To 84 perches of widening and deepening the present southern Road Drain from Lumcloon Bridge to the Pipe at Bunn- at	2/	8	8	—
	To 60 perches of widening and deepening Tap Drain from said Pipe to the Red Bog - - - - - - - -	2/	6	—	—
	To making 26 perches of Main Drain from said Tap through the high Red Bog, average 10 feet sinking - - - - -	15/7	20	5	2

Eſtimate of Expenses for the Bogs of Lough Boura and Beanamuck, &c.—*continued.*

No. of Section	——				
		s.	£.	s.	d.
50.	To making 14 perches of Main Drain from said Tap through the high Red Bog, - - average 15 feet sinking - - at	40/	28	—	—
	To 120 perches of D° - D° - 12 - D° - - -	24/6	147	—	—
	To 116 perches of D° - D° - 11 - D° - - -	18/2	105	7	4
	To 96 perches of D° - forming the Cross Navigation Drain through the bed of Lough Boura, average 9 feet sinking - -	32/3	154	16	—
	To dressing down Banks and gravelling Trackways on both sides of 96 perches - - - - - - - - -	10/	48	—	—
	To 10 perches of Main Drain from the edge of Lough Boura towards Bourawn Island, average 13 feet sinking - - -	28/	14	—	—
	To 64 perches of D° - D° - 12 - D° - - -	24/6	78	8	—
	To 40 perches of D° - D° - 11 - D° - - -	18/2	36	6	8
	To 550 perches of D° - D° - 12 - D° in the Bog Weſt of Beanamuck - - - - - - - - -	24/6	673	15	—
	To 38 perches of D° - D° - 8 - D° and ending at the ſtream of Derrydorney - - - - - - -	7/3	13	15	6
	To 40 perches additional Excavation for future Navigation Line commencing near Beanamuck, average 44 yards to the perch, at 4 *d.* per yard, or - - - - - - - -	14/8	28	10	—
	To 270 perches of D° - average 81 yards additional Excavation to the perch, at 4 *d.* per yard, or - - - - -	27/	364	10	—
	To 38 perches of D° - average 70 yards additional Excavation to the perch, at 4 *d.* or - - - - - -	23/4	44	6	8
	To 696 perches of dressing Banks and gravelling Trackways -	5/	174	—	—
51.	To 34 perches of Navigation Drain, commencing at Gurteen Bridge, average 43 yards additional Excavation to the running perch through clay and gravel, at 4 *d.* per yard, or - -	14/4	25	17	4
	To 84 perches of D° - average 94 yards to the running perch, at 4 *d.* - - - - - - - - -	31/4	131	12	—
	To 92 perches of D° - average 177 yards to the perch, at 6 *d.* or - - - - - - - - -	88/6	407	2	—
	To 102 perches of D° - average 230 yards to the perch, at 6 *d.* or - - - - - - - - -	£.5. 15.	586	10	—
	To 144 perches of D° - through the bed of Lough Boura, average 8 feet sinking - - - - - - -	28/	201	12	—
	To dressing down Banks on both sides and forming Trackways, 912 perches - - - - - - - - -	5/	228	—	—
	To 32 perches of Main Drain, commencing at said Navigable Drain and continuing up a line of cuſh towards Broghall, average 11 feet sinking - - - - - - -	18/2	29	1	4
	To 166 perches of D° - average 10 feet sinking - - -	15/7	129	6	10
	To 80 perches of D° - D° - 11 - D° - - -	18/2	72	13	4
	To 38 perches of D° - D° - 7 - D° - - -	5/10	11	1	8
52.	To 204 perches of Main Drain, commencing at the outlet ſtream of Leabeg and continuing towards Bourawn Island, average 11 feet sinking - - - - - - - -	18/2	185	6	—
	To 100 perches of D° - forming a junction with a Main No. 50, average 10 feet sinking - - - - - - -	15/7	77	18	4
	To 304 perches of Main Drain, parallel to the two laſt items, at 20 perches diſtant and of the same sinking, through the duck-pools, &c. - - - - - - - - -	- -	263	4	4
	To 20 perches of Main Drain along Eaſt side of propoſed Road, average 10 feet sinking - - - - - - -	15/7	15	11	8
	To 80 perches of D° - average 9 feet sinking - - -	11/	44	—	—
	To 40 perches of D° - D° - 8 - D° - - -	7/3	14	10	—
	To 252 perches of D° - D° - 7 - D° - - -	5/10	72	9	—

(*continued.*)

Eſtimate of Expenses for the Bogs of Lough Boura and Beanamuck, &c.—*continued.*

No. of Section		s.	£.	s.	d.
52.	To 392 perches of Main Drain on Weſt side of proposed Road, with a similar sinking to the four laſt items, and amounting to the same sum of	- -	146	10	8
53.	To 160 perches widening, deepening, and in part forming a new course for the Leabeg Stream, average 8 feet sinking	7/3	58	—	—
	To 51 perches of D° - ending at the Bog Road to Beanamuck, average 10 feet sinking	15/7	39	14	9
	To 120 perches of D° - average 10 feet sinking	15/7	93	10	—
	To 80 perches of D° - D° - 12 - D°	24/6	98	—	—
	To 80 perches of D° - D° - 13 - D°	28/	112	—	—
	To 80 perches of D° - D° - 12 - D°	24/6	98	—	—
	To 143 perches of Branch Drain to Beanamuck, average 10 feet sinking	15/7	111	8	5
	To 100 perches of D° - ending at the point D, average 11 feet sinking	18/2	90	16	8
54.	To 454 perches of Main Drain running from Derrydorney towards Leamore, average 9 feet sinking	11/	249	14	—
	To 186 perches of D° - to near Leamore, average 8 feet sinking	7/3	67	8	6
	Additional Excavation for Future Navigation Line No 54.				
	To 40 perches additional Excavation, average 237 yards to the perch, at 6*d.* per yard, through, Bog, clay, and gravel	- -	244	—	—
	To 133 perches additional Excavation, average 178 yards to the perch, at 4*d.* per yard, or	49/4	394	11	4
	To 80 perches of D° - average 162 yards to the perch, at 4*d.* or	54/	216	—	—
	To 120 perches of D° - average 148 yards to the perch, at 4*d.* or	49/4	296	—	—
	To 226 perches of D° - average 77 yards to the perch, at 3*d.* or	19/3	217	10	8
	To 31 perches of D° - partly embanking at the Tullamore Road, average 112 yards to the perch at 3*d.* per yard, or	28/	43	8	—
	To dressing down Banks and gravelling Trackways on both sides for 670 perches	10/	335	—	—
	To 1,340 perches of Back Drains	2/6	167	10	—
	To a wooden Bridge under proposed Road at H	- -	50	—	—
	To 70 perches of cross Navigation Line from Derracheeragh to Coins Island, average 15 feet sinking, at 4*d.* per yard, or	83/6	291	1	8
	To dressing down Banks and forming Trackways on both sides 140 perches	5/	35	—	—
	To 140 perches of Back Drains	2/6	17	10	—
55.	To 126 perches of Main and Tap Drains, commencing at the Barony Bridge, average 7 feet (allowing for present Drain)	3/6	22	1	—
	To 200 perches of Main Drain, average 10 feet sinking to the junction with Gamble's Drain	15/7	155	16	8
	To sinking and widening 208 perches of Gamble's Drain, average 54 yards to the perch	18/	187	4	—
	To 248 perches of Catchwater Drain under the Lands of Killohey and Derrydorney, average 11 feet sinking	18/2	225	5	4
	TOTAL Expense of Main and Navigation Drains -	- £.	8,504	5	10

Eſtimate of Expenses for the Bogs of Lough Boura and Beanamuck, &c.—*continued.*

No. of Section.	———				
		s.	£.	s.	d.
55.	To 526 perches of deepening and widening the Receiving Drain on the verge of Derrybrat and Lumcloon Bogs - - at	5/	131	10	—
	To 773 perches of 8-foot Drains in D° - - - - -	7/3	280	4	3
	To 2,250 perches of Surface Drains in D° - - - -	2/6	281	5	—
	To scouring and deepening 440 perches of the Road Drain -	1/6	33	—	—
	To Nine 8-foot Drains in the Bog between Lough Boura and the Frankford Road at Derrybrat, the whole measuring 1,350 perches - - - - - - - - - -	7/3	489	7	6
	To 9,000 perches of Surface Drains in the ſame, including the Surface Drains of Lough Boura - - - - - - -	2/6	1,125	—	—
	To 10,700 perches of Surface Drains in the great Bog between Lough Boura and Beanamuck - - - - - - -	2/6	1,337	10	—
	To 700 perches of gravelling proposed Road 14 feet wide from the ſtream at Barnaboy to Leabeg - - - - - -	10/	350	—	—
	To 32 perches of D° - with Drains into Bourawn Island -	10/	16	—	—
	To 310 perches of Road Drains from Main Drain No. 50 to Leabeg - - - - - - - - - - - -	5/	77	10	—
	To 472 perches of 8-foot Drains in the Bog of Kilnagol - -	7/3	171	2	—
	To 1,500 perches of D° - in the great Red Bog between Beanamuck and the Road from Garbally to Derrymore -	7/3	543	15	—
	To 1,300 perches of Surface Drains in D° - - - -	2/6	1,625	—	—
	To gravelling 220 perches of present Road from Leabeg to Beanamuck - - - - - - - - - -	10/	110	—	—
	To 660 perches of gravelling proposed Road, intersecting the Navigation Line No. 54 and proceeding to the Road from Garbally to Derrymore, the gravel to be brought chiefly from the Island of Derracheeragh or Derrydorney - - - -	15/	495	—	—
	To 964 perches of Road Drains in addition to the bounding 8-foot Drains in Killohey Bog - - - - - - - -	2/6	120	10	—
	To a wooden Pipe on the Road to Deanamuck - - - -	- -	10	—	—
		£.	7,196	13	9
	Main and Navigations brought forward - - -	- -	8,504	5	10
		£.	15,700	19	7
	Contingent and unforeseen Expences, £.20 per cent. -	- -	3,140	3	11
	TOTAL for Seventh Division - - -	- £.	18,841	3	6

EIGHTH DIVISION,

Comprehending LOG, STONESTOWN, DUNAGH, and WHIGSBOROUGH BOGS:

Containing in the whole 5,055 acres and 2 roods.

3,121 Iriſh. THESE Bogs, lying on the weſt side of the Frankford River, extend along its banks for upwards of two miles; the River for almoſt the whole way between Lumcloon Bridge and the wooden Bridge at Ardgoga, is nearly a dead level, and could at an inconsiderable expense (by dredging a few points) be made navigable for flat-bottomed boats of about 20 tons burthen; having in general a depth of three or four feet water in summer, and five or six feet in flood time. This almoſt navigable River I consider of material advantage in furthering the improvement of these Bogs, as it gives me an opportunity of proposing two branching Lines of Navigation into the interior for the purpose of boating clay and gravel for the cultivation of them, without which the nature of these immense Bogs can never be effectually changed.

The firſt of these Drains, as described in Section No. 56. is proposed to run in a favourable vale, where there is a small ſtream called Coghlan's Brook, extending near a mile from the River to the letter A on the Map, at which point the sinking will not exceed 14 feet, carrying up the bottom of the level 4 feet below the surface of the River in the dryeſt season. From the termination of this Navigable Level at A, I propose a continuation of Catchwater Drain under the hills of Log and Stonestown, terminating near the old Caſtle of Stonestown, with an off branch by the lands of Grove; to this moſt necessary Line of Drain, under the hills of Log and Stonestown, I beg leave to draw your particular attention. These high lands form a part of the great hill of Cloghan, which is the moſt commanding eminence between the River Brusna and the Slievebloom Mountains, abounding on all sides with numerous and never-failing springs. The summit of the Bogs of which I am now treating is from 50 to 55 feet above Macartney Aqueduct, and lies immediately under and is commanded by the said springs of Log and Stonestown, which, for want of a proper ventage are entirely absorbed in them, the consequence of which is, that these waters issuing from the springs, after passing through the subterraneous passages and pores of the Bog, break out in various places all over the lower levels of it, and after making their appearance by rising and sinking in numerous gullyholes, form themselves into small Streams, partly falling eaſtward into the Frankford River, where the lines of Sections No. 56, 64, and 65 are described, and the remainder falling weſtward into the Black Mill ſtream in favourable veins, through which the line of Main Drains 58, 59, and 61, are directed. This natural flow of waters, from one certain source, has induced me to propose the Catchwater Drain under the high lands of Log and Stonestown, the bottom of which is in general laid out at from 10 to 12 feet sinking through the Bog clay and gravel, in order to cut off the springs before-mentioned, without which I am convinced the effectual Drainage of the Bog can never be accompliſhed.

It is a remarkable circumſtance, in proof of the influence of the springs alluded to, that the water now running from a gullyhole into the Black Mill Stream, near two miles from their source, is as clear and cold as if issuing from the hardeſt rock, although it passes through the pores and cavities of the Bog for the whole of that diſtance, being commanded by no other land nearer than Drinagh Island, the springs of which being all on the eaſt side empty themselves by the present Drain into the Frankford River. From the termination of the Navigable Cut at A, Section No. 56, I propose a Main Drain along a line of gullyholes and springs into a cuſh, and up to the lands of Drinagh, along the verge of which the said Drain is continued to the northern point at E, where I propose to commence a Road and Main Drain across the Bog to the lands of Log, at the point B (as described in Section No. 57.) This Road will open a moſt desirable communication between the towns of Frankford and Cloghan, and will also facilitate the conveyance of gravel and clay into the interior of the Bog.

In Section No. 58, you will find described the levels of the Black Mill Stream from Lough Cowra to Crankree Bridge, the fall of which I find to be 5 feet 4 inches, and which I propose to lower to a dead level the whole way from the said Bridge to the Lough. The lowering this ſtream will not only effectually drain Lough Cowra, but will bring into immediate profit the whole of the surrounding scraws and sloughs, amounting to above 200 acres, the greateſt portion of which is now in such a ſtate that no beaſt can venture to graze them, being chiefly composed of ſhaking quagmires. On the same Section you will find the fall to the dam of the Black Mills, which ſhews the further capability of lowering the ſtream if necessary; and also a cross Section from said ſtream to the Island of Drinagh, along a line of subterraneous springs, gullyholes, and ſtanding pools, &c. forming a junction with a proposed Branch Main Drain, communicating with a Line of Main Drain through the centre of the Bog, and discharging into the Black Mill Stream, as described in Section No. 59. By recurring to the Map you will find that this Line of Main Drain, and the Branch connected with it, is directed from the outlet or Black Mill Stream, up a line of subterraneous streams and gullyholes towards the centre of the great Bog of Drinagh; and that its direction is such as to afford ample means of draining the under ſtrata of two particular points marked F and G, in the interior of the Bog, where excellent manuring gravel can be had within from 5 to 8 feet of the surface, which, in such a situation, is a valuable acquisition in furthering the future objects of agricultural improvement. The particular situation of this supply of gravel may be known by the unusual height of the Bog over it, and by the long white reeds that invariably grow in such parts where gravel is near the surface, and which particularly mark these points in the Bog of Drinagh.

In the Bog of Stonestown I have laid out another line of Main Drain No. 61, running from the point H, (where the Bog is 42 feet deep) to the point I, where it will discharge itself into the Black Mill Stream, and which is also described through a similar line of euth and springs as those already mentioned, and where the natural falls of the Bogs are united.

The portion of Bogs adjoining Lough Derry, although lying high, is extremely wet and full of ſtanding pools and small lakes, the moſt conſiderable of which are near the verge of the island called Leagh Derry, and from which there is a hanging level on all sides; yet such is the retentive nature of the Bog, that these lakes are kept conſtantly full of water. There are two Taps brought up to drain these lakes, but not being sunk sufficiently they have proved ineffectual; I hope, however, to accompliſh this object by my proposed Line of Drain to be brought up from the Frankford River near the wooden Bridge to the Drinagh Road, and from thence through the centre of the Bog to the lakes before mentioned, and to get under the present surface of them about 10 feet, as described by Section No. 60.

In the Bog eaſt of Drinagh I propose two Lines of Central Main Drains, together with a Catchwater Drain between Bog and Land, to carry off the great springs of Drinagh into the Frankford River. The firſt of these Drains is proposed to run from the point K across the Bog to the Frankford River, with a fall of 16 feet, as described in Section No. 62. From the point H, on the same line, to near the hill of Brockera, the Main Drain No. 63 is proposed to run, partly discharging into the Main Drain No. 62, and partly into the said Frankford River, from which point the Catchwater Drain is proposed to be brought up and carried along the eaſt verge of Drinagh, till it joins the Main Drain No. 57, and to be sunk to the depths as described in Section No. 66.

The next, and one of the moſt material Lines of Drainage recommended in these Bogs, is a proposed Navigable Cut (as described in Section No. 64) carried up the Black Brook 4 feet under the loweſt surface of the Frankford River, where it forms a junction with it. This Navigable Drain is proposed to run half a mile into the interior of the Bog, at which point the sinking will be 15 feet below the present surface, and it will afford similar benefits in the conveyance of gravel by boat as the proposed Line of Navigation No. 56. From the end of this Navigation a Main Drain is proposed to be continued to the point D, where it forms a junction with Main Drain No. 57. Between this Line of Navigation Drain and the Line through Coghlan's Brook, I also propose another Line of Main Drain on an average of 10 feet sinking (see Section No. 65) along a Line of subterraneous ſtreams called the Blind Brook, and which is the laſt of that description I mean to recommend in these Bogs.

With respect to the manures of the Bog and surrounding lands, in sinking the Navigable Drain up Coghlan's Brook, the chief of the excavation will consist of clay, sand, and excellent manuring gravel, which, with the assistance of gangways and barrows can be spread over the Bog on both sides of the ſtream at the time of excavation, so that cutting the Canal, draining the Bog, and spreading the manure, may be done at one operation. In the Catchwater Drains at Log and Drinagh, and in lowering the Black Mill Stream, will also be raised a great quantity of good gravel; but little or nothing in the way of manure can be expected from the excavation of the reſt of the proposed Drains, the Bog being in general from 20 to 40 feet deep, and the bottom for the moſt part on or under the level of the adjoining outlets.

However, the surrounding lands of Lumeloon, Log, and Streamstown, on the north side, and the lands of Derrinlough, Whigsborough, and Derryadd, on the south and weſt sides, all abound with excellent limeſtone and manuring gravels. The Island of Drinagh, and the points F and G in the interior of the Bog, will also afford good gravel, and the hill of Brockera lying on the edge of the Frankford River, will be sufficient to supply abundance of the same materials to boat down the River, and up the proposed Navigable Cuts.

The Bogs adjoining the Road at Clooneen, and under Whigsborough, are partly drained and in a ſtate of improvement; and the Bogs adjoining Glanduff, and between Derryadd and Lough Cowra, are naturally fine dry Bogs, only requiring the aid of a few Surface Drains, which, when accompliſhed will render the whole admirably circumſtanced for planting, being well sheltered by the different Islands and Derrys by which it is intersected.

The Bog lying on the eaſt side of the Road from Crankree Bridge to Derrinlough is well adapted for Drainage, having a fall from its centre almoſt on all sides to the Black Mill Stream, by which it is bounded; in consequence thereof I have only judged it necessary to recommend a proportionate quantity of Surface Drains. In the middle of this Bog, and on the side of the Road between Crankree Bridge and Derrinlough, is a remarkable inſtance of the possibility of changing the nature of actual Red Bog from an unprofitable ſtate to a profitable one; it consists of a few perches, which as far as I could learn, has been cultivated by a poor man 11 or 12 years ago, and which (contrary to the received opinion that Bog will revert back to its original ſtate of nature) actually produces good paſture to this day, although deserted and left in common with the reſt of the Bog since the improver's death, but for which I am assured he would by this time have reclaimed some acres, notwithſtanding its peculiar disadvantages, being above a quarter of a mile diſtant from the main land, where gravel might be procured, and the under ſtrata above 25 feet from the surface, which almoſt precluded the possibility of obtaining the benefit of those diſtant and inaccessible manures particularly by a person from whose situation in life no expensive experiments could be expected. This small specimen, in my mind, clearly proves that Bog, when properly reduced to an agricultural ſtate, will not haſtily revert back again, or in that ſhort period that persons generally think it will: certainly, if it is merely broken, and laid down without a good sprinkling of manure, and that the Drains are suffered to choak up, it is not to be expected that such loose improvements can be laſting.

The chief proprietors of these Bogs are Lords Ross and Glandore, but I have not been able to find any exiſting bounds or mearing between their properties in them. Mr. Drought of Whigſboro', and Mr. Berry of Cloonen, have also a small portion of them about Lough Cowra, which, in the event of lowering the Lake, will be brought into an immediate ſtate of cultivation. The Lake itself, amounting to above 124 acres (all of which is very ſhallow) will be effectually drained by lowering the Black Mill Stream, as proposed in Section No. 58, and by running the Receiving and Surface Drains through it, as marked on the Map, after which I have no doubt but the greateſt part of it may be reduced to meadow and paſture ground.

In the following Eſtimate the particulars of the Works recommended are enumerated, which I confidently hope are such as will be sufficient to consolidate the Bogs, and prepare them to receive further agricultural improvement.

ESTIMATE of Expenses necessary to execute the proposed Works on the Bogs of Log, Stonestown, Drinagh, and Whigsboro'.

No. of Section					
		s.	£.	s.	d.
56.	To 270 perches of Navigation Drain, 14 feet wide at bottom, average 10 feet sinking - - - at 4½*d.* per yard	55/6	749	5	—
	To 540 perches of dressing-down Banks and forming Trackways	5/	135	—	—
	To 540 perches of Back Drains to D° - - - - -	2/6	67	10	—
	To 480 perches of Catchwater Drain, commencing at the end of said Navigable Cut, and proceeding round the Land of Log and Streamstown, average 10 feet sinking - - - -	15/7	374	—	—
	To 142 perches of Branch Catchwater Drain under the Lands of Grove, average 9 feet sinking - - - - at	11/	78	12	—
57.	To 20 perches of Main Drain, commencing at A, Section No. 56, and proceeding across the High Red Bog towards the Island of Drinagh, average 12 feet sinking - - - - - -	24/6	24	10	—
	To 40 perches of D°, average 13 feet sinking - - -	28/	56	—	—
	To 40 perches of D° - D° 14 feet D° - - - -	32/	64	—	—
	To 40 perches of D° - D° 15 feet D° - - - -	40/	80	—	—
	To 51 perches of D° - D° 11 feet D° - - - -	18/2	46	6	6
	To 185 perches of D° - D° 8 feet D° - - - -	7/3	67	1	3
	To 56 perches of D° - D° 10 feet D° - - - -	15/7	43	12	8
	To 228 perches of D° - D° 12 feet D° - - - -	24/6	279	6	—
58.	To 360 perches of deepening and widening the Black Mill Stream, commencing at junction of Main No 59, and proceeding to Lough Cowra on a level with the bottom of Crankree Bridge, and which is proposed to be 4 feet at bottom, average 40 cubic yards to perch - at 6*d.* per yard, or	20/	360	—	—

Eſtimate of Expenses necessary to execute proposed Works in Log, Stonestown, &c.—*continued.*

No. of Section.		s.	£.	s.	d.
58.	To 284 perches of Cross Main Drain, from the Black Mill Stream to Drinagh Island, along a line of subterraneous ſtreams, gullies, pools, &c. average 12 feet sinking - -	24/6	347	18	—
59.	To 75 perches of Main Drain, commencing at the Black Mill Stream, and proceeding up a line of springs and gullyholes towards Drinagh, average 9 feet - - - - - -	11/	41	5	—
	To 70 perches of D°, ending at the junction of the Branch Main Drain, average 13 feet sinking - - - - - -	28/	98	—	—
	To 60 perches of D°, proceeding towards Stonestown, average 13 feet sinking - - - - - - - -	28/	84	—	—
	To 80 perches of D° - average 14 feet sinking - - - -	32/	128	—	—
	To 96 perches of D° - - D° 12 feet D° - - -	24/6	117	12	—
	To 70 perches of D° - - D° 10 feet D° - - -	15/7	54	10	10
	To 146 perches of Catchwater Drain under the point of Stonestown, communicating with Drain No. 56, average 7 feet sinking - - - - - - - - - -	5/10	42	11	—
	To 70 perches of Branch Main Drain, average 12 feet sinking	24/6	85	15	—
	To 64 perches of D°, falling into Main No. 58, average 11 feet sinking - - - - - - - - - -	18/2	58	2	—
60.	To 67 D° - of Main Tap Drain, commencing near Leagh Derry, and running through the small Lough towards the Drinah Road, average 12 feet sinking - - - - -	24/6	82	1	6
	To 80 perches of D°, average 13 feet sinking - - - -	28/	112	—	—
	To 40 perches of D° - D° 12 feet D° - - - -	24/6	49	—	—
	To 17 D° - of D°, ending at the Road, average 9 feet sinking	11/	9	7	—
	To 42 D° - of D°, average 7 feet sinking - - - -	5/10	12	5	—
	To 43 D° - of D° - D° 5 feet D° - - - - -	2/6	5	7	6
	To a new Pipe across Derryadd Road - - - - - -	- -	5	—	—
61.	To 36 perches of Main Drain, commencing at the Black Mill Stream, and proceeding up a line of springs and gulfs towards Poor Man's Hole, average 6 feet sinking - - - -	3/6	11	14	—
	To 38 perches of D°, passing near the Thorn Buſh, average 10 feet sinking - - - - - - - -	15/7	29	15	4
	To 32 perches of D°, average 13 feet sinking - - -	28/	44	16	—
	To 186 perches of D° - D° - 14 feet D° - - - -	32/	137	12	—
	To 28 perches of D°, ending at Poor Man's Hole, average 12 feet sinking - - - - - - - - -	24/6	34	6	—
62.	To 24 perches, commencing at Drinagh, average 6 feet sinking	3/6	4	4	—
	To 44 perches of Main Drain from Drinagh towards the Frankford River, average 8 feet sinking - - - - - -	7/3	15	19	—
	To 160 perches of D°, average 12 feet sinking - - -	24/6	196	—	—
	To 20 perches of D° - D° 10 D° - D° - - - - -	15/7	20	11	8
	To 8 perches of D° - D° 6 D° - D° - - - - -	3/6	1	8	—
63.	To 40 perches of Main Drain running from No. 62 towards Brockera, average 11 feet sinking - - - -	18/2	36	6	8
	To 138 perches of Main Drain, average 12 feet sinking - -	24/6	169	1	—
	To 28 perches of - D° - - D° - 8 D° D° - -	7/3	10	3	—
64.	To 60 perches of Navigation - D° - 6 D° D° - -	21/	63	—	—
	To 48 D° - - D° - - - D° - 10 D° D° - -	43/2	104	8	—
	To 50 D° - - D° - - - D° - 13 D° D° - -	69/	172	10	—
	To 18 D° of Main Drain - D° - 12 D° D° - -	24/6	22	1	—
	To 104 D° - - D° - - - D° - 8 D° D° - -	7/3	37	14	—

(continued)

Eſtimate of Expenses necessary to execute proposed Works in Log, Stonestown, &c.—*continued.*

No. of Section					
		s.	£.	s.	d.
64.	To 316 perches of dressing-down Banks and gravelling Track-ways	5/	79	—	—
	To 316 perches of Back Drains	2/6	39	10	—
65.	To 16 perches of Main Drain, commencing at the Frankford Road, and along the Blind Brook, average 3 feet sinking	2/	1	12	—
	To 158 perches of Main Drain, average 10 feet sinking	15/7	123	1	2
	To 76 D° of D° D° 11 feet D°	18/2	69	—	8
66.	To 114 perches of Catchwater Drain, under the eaſt of Drinagh Island, average 6 feet sinking	3/6	19	19	—
	To 66 perches of D°, average 8 feet sinking	7/3	23	18	6
	To 94 D° D° D° 7 feet D° along present Stream	5/10	27	8	4
	To deepening and widening 78 perches of said Stream to the Frankford River	3/	11	14	—
	To 200 perches of 8-foot Receiving Drain in the Bog of Log	7/3	72	10	—
	To 250 perches of 8-foot Drains through the present bed of Lough Coura	7/3	90	12	6
	TOTAL Expense for Main and Receiving Drains	£.	5,427	15	5
	To 800 perches of Surface Drains through the present bed of Lough Coura	2/6	100	—	—
	To 1,000 perches of D°, through the ſhaking Scraws and Loughs, and through the Bogs between Whigsboro' and the Lough	2/6	125	—	—
	To 650 perches of D°, in the Bogs between Leagh Derry and Derrymullen	2/6	81	5	—
	To 3,100 perches of D°, between Leagh Derry and Drinagh, and through the Bog of Derryadd, &c.	2/6	387	10	—
	To 12,700 perches of Surface Drains in the remainder of the Bogs of Drinagh, Lumcloon, Log, &c. &c.	2/6	1,587	10	—
	To 300 perches of gravelling proposed Road between Log and Drinagh	12/	180	—	—
	To 300 perches of Road Drain	2/6	37	10	—
	To a Bridge under said Road at B	- -	30	—	—
	To scouring about 2,000 perches of present Drains in Derryadd, Derrymullen, and Whigsboro' Bogs	1/6	150	—	—
	To 800 perches of D°, about Drinagh and Brockera	1/6	60	—	—
	TOTAL for Surface Drains, &c.	£.	2,738	15	—
	TOTAL for Main Drains, as above	- -	5,427	15	5
		£.	8,166	10	5
	Contingent and unforeseen Expenses, 20 per Cᵗ	- -	1,633	6	1
	TOTAL Amount for Eighth Division	£.	9,799	16	6

NINTH DIVISION,

Comprehending COOLGOWNY and GARBALLY BOGS, &c.

Containing in the whole 3,688 acres 1 rood 18 perches.

2,277 Iriſh.

THE Bogs to which I have now the honour to draw your attention are adjoining thoſe included in the Eighth Division, being only ſeparated by the Road from Crankree Bridge to the Five Alley, and by the lands of Derrinlough. Commencing at Crankree Bridge, about a mile and a half from Cloghan, the Bogs ſtretch acroſs to Balever on the north, Galros and Garbally on the ſouth, Derrinlough and Clooneen on the eaſt, and Cloongowny and Boaradurra on the weſt. There are included in this tract eleven ſmall Iſlands of clay and gravel, together with ſeveral grazing cuſhes of Black Bog, and a large tract brought into a ſtate of cultivation by Mr. Wood, of Garbally, all of which are particularly deſcribed in the Map.

This extent of Bog generally lies very high, particularly the part joining Balever, which is 60 feet above the keyſtone of Macartney Aqueduct, and 96 feet above the River Shannon (in Midſummer) at Banagher. From Balever the Bog falls to the centre about 7 feet at the eaſt end of Mr. Wood's improvements, here it is 53 feet above Macartney Aqueduct, and from this point the Bog falls to the ſouth, eaſt, and weſt; on the ſouth it falls to the Road leading from Banagher to Frankford, and to Clooneen, where its waters are diſcharged in Lough Cowra; on the eaſt it falls towards Derrinlough, and the Road leading from Crankree Bridge to Whigsboro'; and on the weſt it falls to the ſtreams of Garbally and Boaradurra, which are the chief outlets to the whole of this Diviſion of the Diſtrict; into the former of which all the Drains connected with Mr. Wood's improvements are directed, and which alſo affords a good ſupply of water, and an excellent fall for a mill. This outlet ſtream runs towards the Black Bull with conſiderable fall, but which I have not deemed neceſſary to aſcertain further than the ſmall Bridge at the point A, near Mr. Wood's of Garbally, which point I find is nearly 50 feet under the higheſt part of the Bog next Balever, and is from 20 to 40 feet below the whole extent of the Red Bogs now under conſideration.

The outlet ſtream at Boaradurra alſo poſſeſſes great capability, and is ſufficiently low to receive all the water falling between the ſummit at Balever and the lands of Cloongowny, a diſtance of about a mile and half, and including above 1,300 acres of extremely wet Bog. The other principal outlets are at Crankree into the Black Mill Stream, and at Clooneen, where, as before-mentioned, the waters eventually diſcharge themſelves into Lough Cowra. In addition to thoſe great outlets there are other minor ventages at Balever and Galros, which, although not ſufficiently low for Main Taps, yet they are of advantage to the portion of Bogs connected with them in carrying off their ſurface waters. With all thoſe ventages I have connected conſiderable lines of propoſed Main and Receiving Drains, into which the Surface Drains for the whole maſs of Bog are directed. The firſt of theſe Lines of propoſed Main Drain is intended to commence at the pipe of Boaradurra (near Mr Croghwell's) and to continue up the preſent line of ſtream for 128 perches to the point B, where I propoſe continuing up to a great cuſh and line of ſubterraneous ſprings to Balever Bog (which is the ſummit of the whole of this Line of Tract). At the end of ſaid 128 perches I propoſe to ſink 8 feet 6 inches below the preſent ſurface, and to continue up the cuſh on an average of 10 feet ſinking for 210 perches to the point C, from which the Bog runs high, wet and deep, and therefore the ſinking is increaſed to 15 feet, and which may ſtill be further deepened if neceſſary, according as the Bog ſubſides. Into this line of Main Drain will fall a conſiderable number of Surface Drains, and alſo the Main Drain No. 69, and part of the waters of No. 68 are propoſed to fall into this outlet.

The next general Line of Main Drainage is a Tap brought from the Black Mill Stream at Crankree Bridge, along the weſt ſide of the Road to Derrinlough as far as the point D, increaſing the preſent Drain to an average of 8 feet deep and 11 feet wide. From the point D, which is 76 perches from Crankree Bridge, the propoſed Tap is turned into the high Red Bog of Carrick, &c. and runs in a direct line to the high Iſland of clay and gravel in the centre of that Bog, which is the ſource of the numerous ſprings that break out below its level. For the whole diſtance between the Road and ſaid Iſland this propoſed Tap will paſs through a very wet ſhaking Bog, full of pools and quagmires for about 180 perches, with an average ſinking of about 12 feet below the preſent ſurface of the Bog, but which on being tapped muſt ſubſide ſeveral feet; after this it is probable the Drain may not be above 8 feet deep, although now deſigned to be ſunk 12 feet under the preſent ſurface.

If, however, any further ſinking ſhould be found neceſſary, the Tap at Crankree Bridge will be found ſufficient to effect the Drainage of the Bog for ſeveral feet below the under ſtrata, as appears by Section No. 68. From the Iſland of clay and gravel before-mentioned, which is the ſummit of this line, the Main Drain is directed through a long line of cuſh and ſubterraneous ſprings for above 200 perches, at the end of which it diſcharges its waters into the firſt-mentioned Main Line No. 67, at the point E, where it alſo forms a junction with the Stream from Timolin.

From the south side of the gravel hill and Island before-mentioned I propose to commence my third Line of Main Drain in these Bogs, according to Section No. 69; this Drain is directed through another line of cuſh and springs till it falls into the Boundary Drain of Mr. Wood's improved Bogs at the point F, and to continue down the same to the point G, on an average of 8 feet sinking. From this point the course of the Drain is directed through the centre of the Bog of Cloongowny, where it will receive almoſt the whole of its Surface Drainage, till it forms a junction with Main No. 67, at the point B. The average sinking from G to B will be 10 feet for a diſtance of 295 perches, through a very deep Red Bog.

In Section No. 70, you will find described the Levels of a long Line of Main Drain communicating with the two greateſt outlets connected with those Bogs, the one at Crankree Bridge, and the other at the opposite extremity at the Bridge of Garbally, diſtant from each other near 3 miles, the commencement of this Main Drain is at the point D (where it is proposed to discharge its waters into Tap Drain No. 68, from Crankree Bridge) and to continue along the weſt side of the Road for 96 perches, on an average of 8 feet sinking to the point H; then turning into the Bog up a line of subterraneous springs and gullyholes for 160 perches to the point I, it is proposed to continue to the summit between Mr. Wood's improvements and Derrinlough Island. From this point to H and D, the Drain will have a considerable fall, calculated to carry off the waters of numerous Surface Drains.

From this summit the course of the Drain is directed to the centre of the Bog of Garbally at the point K, passing through a ſhallow part of the Bog where the gravel is within 3 feet of the surface, and which for so much will be found to afford a useful supply for the surrounding Bog. At the point K, this Drain will form a junction with another proposed Drain No. 71 (running from the high Island called the Furry Hill, to the Barony Bounds at Galros) from which its course is directed to the Garbally outlet stream at the point L, where it is sufficiently low, being 28 feet under the summit, to receive and carry off all the waters of these Main Drains. However, the fall may be ſtill further increased to 40 feet by going lower down towards the Bridge of Garbally, where the ventage is capable of draining the Bog even below the under ſtrata, as appears by Section No. 70. The line of Main Drain No. 71, which, as before-mentioned, forms a junction with No. 70, may in fact be called two different lines connected by one common centre at the point K; the one part running from the high Furry Hill belonging to Mr. Berry, and the other running to the Barony Bounds at Galros, where there is a good outlet falling down the Rape Mill Stream. The portion of Bog through which these lines are directed is the deepeſt of the whole of this tract, and is for the moſt part one entire mass of ſhaking quagmire, which cannot be reduced to a ſtate of consolidation but by the greateſt perseverance in deepening the Main Taps through it; for which reason I am induced to recommend the deep sinking, as described between the points K and L in Section No. 70, and which is also attended to in Section 71. From the point I, in the Bog of Derrinlough, I propose my 72d line of Main Drain, running by M N and O, where it falls into Mr. Berry's Main Drain at Clooneen, and discharging through the sunk Bridge into Lough Coura. Between the points I and M, this Bog is in the very worſt ſtate, being interspersed with deep holes and sloughs fully charged with water, which will require great perseverance in deep sinking to reduce them to consolidation, to effect which, I would recommend the bottom of the Bridge at the point O to be lowered three feet, from which point Mr. Berry's Main Drain is proposed to be lowered on an average of five feet below the present bottom at the point N, from whence its course is directed to M, and through the centre of the Red Bog to I, where it forms a junction with Main Drain No. 70. In addition to this Drain I am induced (from the very bad ſtate of that part of the Bog adjoining Derrinlough) to propose a parallel 8-foot Drain between No. 71 and the land, which will also discharge into Mr. Berry's Main Drain near the point O. To the line of Section No. 73, I now beg leave to draw your attention. It is a proposed Catchwater Drain, to intercept and draw off a great head of springs from the summit of Coolderry and Coolfin Bogs, which now flow with very little interruption into all that part of the Bog on the weſt side of the Road from Cloghan to Birr. These springs rise on the weſt side of the Bog under the lands of Coolfin and Timolin, and I am convinced are the chief supply to Poulanore, or the Golden Hole. It may not be improper to remark here the meaning of Poulamore (which you will see marked on the Map) or the Golden Hole, which takes its name from the circumſtance of continual sums of money being expended in filling it up with gravel according as the Road sunk. This hole was originally one of those gully or swallow-holes, so frequently mentioned in the course of my Report, in which the subterraneous ſtreams from the higher levels of Coolfin made their firſt appearance, immediately sinking again before they assumed the shape of a regular and visible ſtream. In making the Road from Cloghan to Birr, about 70 or 80 years ago, it was laid out across this hole, in order to preserve a direct line from one side of the Bog to the other; in the execution of which many were the expedients used to carry off the water, and keep the Road to its proper level, such as driving piles, and filling between them with furze, brushwood, &c. &c. all of which proved ineffectual, being only calculated to carry off, and *not to intercept* the supply flowing from the high lands; and to this day there is a conſtant spring issuing out of the upper side of the Drain, and which, but for the attention paid to it by the neighbouring gentlemen, would rise to such a height as to render the Road impassable even in the drieſt season. To remedy this evil, as well as to effect the drainage of this part of the Bog, I have proposed this line of Catchwater Drain, commencing at the outlet ſtream near Croghwells, and continuing up a line of present Drain under Balleaghter and Coolderry, and ſtraight across to Timolin, cutting off to the weſt the great springs and sloughs already alluded to; through the centre of which I propose to run a communicating 8-foot Drain, which will give ample vent to this head of waters, that have now no other passage but the pores and cavities of the Bog.

This is the laſt Main Drain of large dimensions I mean to recommend in this Division of the Diſtrict; I would however propose a few 8-foot Receiving Drains in the interior and on the weſt of the Road from Timolin to Boaradurra, together with a small Catchwater Drain under the Hill of Balever, all which ſhall be provided for in the Eſtimate.

The whole of these Bogs are moſt favourably circumſtanced for effecting agricultural improvements, having abundance of limeſtone and manuring gravels in all the surrounding lands, particularly at Derrinlough, Balever, Timolin, Cloongowny and Garbally, besides numerous gravel hills and cuſhes interspersed through them; and also some situations where gravel can be had within 3 feet of the surface, as appears by Sections No. 69 and 70.

Of Improvements already effected, a good deal has been done by Mr. Armſtrong at Balever, Mr. Berry of Clooneen, and Mr. Woods of Garbally; which latter are by much the moſt extensive, amounting to near 240 acres, which, being favourably interspersed with gravel hills, were more readily brought into cultivation. These, with their other natural capabilities, have been judiciously taken advantage of by Mr. Woods, who has now the chief part of his Bog in a moſt promising ſtate of improvement. Much credit is also due to Mr. Berry, for his exertion and perseverance in tapping the Bog of Cloneen, by which he has completely drained several ſtanding pools that contained from 3 to 5 feet water. He has also made some skreen plantations on the Bog that appear very healthy. On the whole, his Bogs may be said to display a spirit of improvement which is highly worthy of imitation.

ESTIMATE of Expenses necessary to execute the proposed Works on the BOGS of COOLGOWNY, GARBALLY, &c. &c.

No. of Section.		s.	£.	s.	d.
	To widening and sinking 48 perches of Main Drain, commencing at the pipe of Croghwell's, and continuing along the Road and up the Stream towards Timolin - - - - at	3/	7	4	—
	To 80 perches of D° along the line of ſtream to the point B, average 7 feet sinking - - - - - - -	5/10	23	6	8
	To 212 perches of Main Drain, from B to C, average 10 feet sinking - - - - - - - - - -	15/7	165	3	8
	To 44 perches of - D° - average 12 feet sinking - -	24/6	53	18	—
	To 80 perches of - D° - - - - 15 D° - - -	40/	160	—	—
	To 40 perches of - D° - - - - 13 D° - - -	28/	56	—	—
	To 40 perches of - D° - - - - 9 D° - - -	11/	22	—	—
68.	To 210 perches of - D°, commencing at the point E, and continuing up the great Cuſh towards the Island in Carrick Bog, average 9 feet sinking - - - - - -	11/	115	10	—
	To 40 perches of - D°, along the verge of said Island, average 11 feet sinking, through clay, gravel and Bog - -	24/	48	—	—
	To 46 perches of - D°, average 14 feet sinking - -	32/	73	12	—
	To 80 perches of - D° - - 13 - D° - - -	28/	112	—	—
	To 40 perches of - D° - - 14 - D° - - -	32/	64	—	—
	To 66 perches of - D° - - 12 - D° - - -	24/6	80	17	—
	To 40 perches of - D° - - 15 - D° - - -	40/	80	—	—
	To 50 perches of - D°, along the present Weſtern Road Drain from the point D, towards Crankree Bridge - -	5/	12	10	—
69.	To 94 perches of - D°, commencing at the point B, and taking a central direction through the Bog of Cloongowney, average 10 feet sinking - - - - - - -	15/7	73	4	10

(*continued.*)

Eſtimate of Expenses necessary to execute proposed Works in Coolgowny Bog, &c.—*continued.*

No of Section.	———				
		s.	*£.*	*s*	*d.*
69.	To 122 perches of Main Drain, average 12 feet sinking - at	24/6	149	9	6
	To 80 perches of - D°, ending at the point G. at Mr. Woods's Improvements, average 9 feet sinking	11/	44	—	—
	To deepening and widening 82 perches of Mr. Woods's Drain, making it on an average 8 feet deep	6/	24	12	—
	To 108 perches of D°, from the point E, to the Gravel Hill, average 8 feet sinking	7/3	39	3	—
70.	To 16 perches of Central Main Drain, through Garbally Bog, commencing at the point L. - - average 8 feet sinking	7/3	5	16	—
	To 24 perches of - - D° - - - - - - 12 - D° -	24/6	29	8	—
	To 142 perches of - - D° - ending at K, 13 - D° -	28/	198	16	—
	To 124 perches of - - D° - - - - - - 11 - D° -	18/2	112	12	8
	To 40 perches of - - D° - - - - - - 9 - D° -	11/	22	—	—
	To 120 perches of - - D° - - - - - to I, 11 - D° -	18/2	109	—	—
	To 80 perches of - - D° - - - - - - 12 - D° -	24/6	98	—	—
	To 80 perches of - - D° to the Road at H, 10 - D° -	15/7	62	6	8
	To 96 perches of deepening and widening the Road Drain from H to D, to 8 feet deep	6/	28	16	—
71.	To 24 perches of deepening and widening the Barony Bounds at Galros, sinking 9 feet below the surface of the Road	6/	7	4	—
	To 168 perches of Main Drain from said Barony Bounds through the Bog of Garbally, and ending at K, average 11 feet sinking	18/2	152	12	—
	To 70 perches of - D° - from said point K, to the Furry Island, average 10 feet sinking	15/7	54	10	10
72.	To 38 perches of - D° - commencing at the Letter I, in Derrinlough Bog, and proceeding towards Clooneen, average 12 feet sinking	24/6	46	11	—
	To 113 perches of - D° - through deep holes and sloughs, average 12 feet sinking	24/6	138	6	8
	To 80 perches of - D° - to Mr. Berry's Drain, at the point M, average 12 feet sinking	24/6	98	—	—
	To deepening and widening 40 perches of Mr. Berry's Drain, 6 feet lower than the present bottom, and 11 feet below the surface	8/	16	—	—
	To 22 perches of D°, sinking 7 feet below the surface to the point N, through bog, clay, &c.	30/	33	—	—
	To 49 perches of deepening said Main Drain, along Mr. Berry's Plantation, average 5 feet below the present bottom, in clay and gravel	20/	49	—	—
	To 37 perches of - D° - deepening 4 feet below the present bottom or 10 feet below the surface, in clay and gravel	20/	37	—	—
	To pulling down and rebuilding Clooneen Bridge at the point O, 3 feet lower than the present one	- -	20	—	—
	To deepening 16 perches below the Bridge	5/	4	—	—
73.	To deepening and widening 38 perches of the Road Drain, from the outlet pipe at Mr. Croghwell's, to Balleaghter	3/	5	14	—
	To deepening and widening 104 perches of the present Drain, from the Banagher Road along the verge of Balleaghter	4/	20	16	—
	To deepening and widening 120 perches of said Drain, along Coolderry, sinking on an average 3 feet wide below the present bottom, in clay and gravel	6/	36	—	—

Eſtimate of Expenses neceſſary to execute propoſed Works in Coolgowny Bog, &c.—*continued.*

No. of Section			£.	s.	d.
73.	To making 42 perches of Catchwater Drain, under the springs of Coolfin, average 17 feet sinking - - - - - at	s. 18/2	38	3	—
	To 60 perches of 8-foot Drain in Coolfin Bog, communicating with Catchwater Drain No. 73. - - - - - -	7/3	21	15	—
	To 180 perches of deepening and widening the small ſtream from Timolin, average 8 feet sinking - - - - - -	7/3	65	5	—
	To 165 perches of 8-foot Catchwater Drain under Balever Hill	7/3	59	16	3
	To 130 perches of 8-foot Drain in the Bog of Cloongowny, and falling into Main Drain No. 69. - - - - - - -	7/3	47	2	6
	To widening and sinking 230 perches of the Weſtern Road Drain, from Boaradurra to Timolin - - - - - -	5/	57	10	—
	To deepening and widening 320 perches of the Boundary Drain, running from the point L, along the Eaſt side of Mr. Wood's Improvements - - - - - - - -	2/	32	—	—
	To deepening and widening 540 perches of - - D° - - on the Weſt side of Mr Wood's Bogs - - - - - -	2/	54	—	—
	To 600 perches of 8-foot Drains in the Bog of Carrick - -	7/3	217	10	—
	To 220 perches of - D° - in Derrinlough Bog - -	7/3	75	15	—
	To 240 perches of - D° - under the Hills of Garbally -	7/3	87	—	—
	To 170 perches of widening and sinking the Northern Road Drain from Garbally to Downs - - - - -	2/	17	—	—
	To a Bridge over the Barony Bounds at Garbally - - -	- -	20	—	—
	Total for Main and Receiving Drains - -	- £.	3,582	16	9
	To 800 perches of Surface Drains in the Bogs of Timolin and Coolderry - - - - - - - - - at	2/6	100	—	—
	To 3,000 perches of - - D° - in the Bog between Cloongowny and Balever - - - - - - - -	2/6	375	—	—
	To 2,800 perches of - - D° - in the Bog of Carrick, and to Mr. Wood's Improvements - - - - - -	2/6	350	—	—
	To 3,400 perches of - - D° - in the Bogs of Derrinlough, Clooneen and Galros - - - - - -	2/6	425	—	—
	To 1,100 perches of - - D° - in the Bog of Garbally -	2/6	137	10	—
	Total for Surface Drains - - -	- £.	1,387	10	—
	Main and Receiving Drains, as above - - -	- -	3,582	16	9
			4,970	6	9
	Contingencies and unforeseen Expenses, £. 20. per Cent.	- -	994	1	4
	TOTAL AMOUNT for Ninth Division - -	- £.	5,964	8	1

TENTH DIVISION:

Comprehending CLOGHEL, DOWRIS, and GALROS BOGS, &c.

776 Iriſh.

Containing in the whole 1,257 acres.

THESE Bogs, the ſubject of this portion of my Report, are situate about two miles north of the town of Birr, in the Barony of Egliſh, and are entirely surrounded by high lands, except the weſt end, from whence the ſtream issues that supplies the Rape Mills of Ballaghanogher, which ſtream is the only ventage for all this tract. The principal part of the waters of this ſtream runs from the Mills of Egliſh, but it is considerably increased by its junction with the waters from the springs on the summit of this Bog at Ballycollon and Galros, the whole of which are conducted by Mr. Berry's Main Drain to the Barony bounds at the point A, a ſhort space below which they join the Egliſh Stream, and thus combined run for about a mile to the Rape Mills of Ballaghanogher. This ſtream is at present partly navigable for small boats, with which the surrounding inhabitants convey their turf from Cons Park Bog towards the Rape Mills; and this partial navigation, though very inconvenient from the natural crooked windings of the River, is yet so evidently advantageous, as to be adopted by every person who has to draw turf from that Bog to the vicinity of the Rape Mills &c. The natural capability of the whole of this Line, together with my decided preference to water carriage, has induced me to propose converting it into a Navigable Drain from the point A, at the Barony Stream, to B C, and D, where it will end in the gravel hills of Cloghill, about 10 feet below the present surface (as appears by Section No. 74.) the excavation of which will of itself be sufficient to supply a great quantity of gravel for the interior of the Bog. From the termination of this Navigable Cut, I propose a continuation of Catchwater Drain under the hills of Cloghill, in the line of the present Drain made by Mr. Berry, which, though of small dimensions, is conſtantly supplied with running water by the springs which boil up in its bottom near the lands of Ballycollen, which by additional sinking of 4 or 5 feet will be completely cut off, and carried into the proposed Navigation line; and in continuation of said Drain I propose it to run across the Bog to the Lough under Coolog, by which it will be lowered 7 feet. This Lough contains about an acre, and is the largeſt of three small Lakes situated on the higheſt point of this Bog.

I beg leave here to ſtate, that although I recommend Navigation and Main Drains to communicate with these Lakes, it is not with a view to their complete Drainage, from a conviction arising from their particular circumſtances that such a measure, if even within moderate expense, would not be necessary. The fact on which I have drawn my conclusion is simply this, that these Lakes *do not* contribute to keep these Bogs in a ſtate of wetness, being themselves retained and held within a ſtaunch and firm ſtratum of the bog and clay by which they are encompassed and maintained on different levels, above 20 feet in depth, and without any communication whatever with each other; this I proved by taking the level of the two largeſt, by which I ascertained there was a difference of 2 feet 6 inches between the level of the one and the other, although within a few perches of each other. It may, however, be said, that although the lesser Lake, which is the higheſt, may not communicate with the greater, yet the greater one may afford a continual supply of water by which the Bog is kept conſtantly saturated; but the fact of this has also been ascertained, for by boring near 30 feet, at the very edge of the largeſt Lake, the ſtuff brought up in the augur was dry and crumbling, whereas that which was raised in the interior was found exceeding wet, and almoſt in a liquid ſtate. These incontrovertible facts are, in my mind, such as to juſtify me in not providing for the complete Drainage of these Lakes; however, if at a future day such expedient would be found necessary, it can be effected by sinking the Navigation Drain No. 78, or the aforesaid Catchwater Drain No. 74, which being continued as far as the point F, is terminated under the hill of Whigſborough.

Connected with the laſt general Line of Drainage, and commencing at Ballycollon Lough, I propose a central Line of Main Navigation Drain running from the point E, through the interior of the Bog to the points L and I. From E to L, a diſtance of above one-third of a mile, is the part proposed to be made navigable according to Section No. 78, by which the immense quantities of gravel to be found in the almoſt perpendicular hills of Ballycollon may be conveyed to the centre of the Bogs of Coolog, Ballycollin, and Dowris, thereby affording the aid of those materials to within less than a quarter of a mile of any point of these tracts. From L to I the Drain is proposed, in the firſt inſtance, to operate as a Tap to the whole of the Bog, by which it will be prepared to receive the manures for their future cultivation; after which it will be sufficient to receive the waters of the Back Drains, and the Surface Drains connected with them.

In addition to this Line I have also to recommend a line of Catchwater Drain from the point J to [illegible], entirely surrounding the north side under Dowris, Galros, and Whigſborough, to the point F, as described in Section No. 77. From I to K, the course of this Drain is directed along the Bog Road in the line of Mr. Berry's present Tap Drain as far as the point K, from whence it is proposed to be brought along the Bog edge under the hills of Dowris and Whigſborough, as before-mentioned.

In the Bogs of Galros and Cloghel I also propose two Cross Main Drains No. 75 and 76, running from the point B, the one across the Bog of Galros, and the other across the Bog of Cloghell, towards Mr. Molloy's; near the direction of this laſt-mentioned line, and in the centre of the Bog of Cloghell, I have found sand and gravel within 8 feet of the surface (very much to the surprize of the persons living in that neighbourhood) from which this Drain is calculated to draw off the under water, thereby enabling the improver to take advantage of the under ſtrata in reclaiming the surrounding surface, which at the diſtance of a quarter mile from the land or navigable communication, might otherwise be precluded the benefit of such manures at a reasonable expense. From these lines of Main Drains I have laid out two 8-foot Drains, running from the summit towards the common outlet ſtream near the point A, receiving in their progress a number of Surface Drains.

These Lines of Drainage, together with a Catchwater Drain of small dimensions under the Hill of Cloghell, and another under the lands of Galros, are all the Drains of the firſt and second Class which I mean to recommend in the Bogs of Ballycollen, Cloghell, Dowris, and Galros.

There is however another portion of these Bogs, which, although detached, may be said to form a part of them, being separated only by the outlet ſtream to the Rape Mills. This Tract, which is called Conspark Bog, is entirely bounded on the north side by the said outlet ſtream, which being the loweſt point of ventage precludes the necessity of bringing up any other Tap, and therefore I have only to recommend a proportionate quantity of Surface Drains, and widening and sinking those already made, which, when complete, will I truſt be sufficient to reduce the whole of these Bogs to a ſtate of consolidation, to which they have been already far advanced by the exertions of Mr. Berry of Egliſh, who by his indefatigable perseverance, has succeeded so far as to be able to turn out his cattle on the parts that were a few years back nothing better than a ſhaking quagmire and scraw; this he accompliſhed by bringing up the before-mentioned Tap from the Rape Mill ſtream, along the line of cuſh or vale, through which I propose, my Navigation Line No. 74. And Mr. Berry assured me, that before he made the said Tap Drain between the points A and C, at the Bog Road, the vein in which it now runs was one continued scraw or slough, into which neither man or beaſt could venture, and which vale is now, for a breadth of 8 or 10 perches on each side, sufficiently dry for agricultural purposes. With these improvements Mr. Berry has also made a Road across the Bog from Cloghall to Galros, along which the heavieſt load might now be drawn, although the under ſtrata over which it passes are no better than liquid marl, as I found after boring through 12 or 15 feet of firm Black Bog. Much credit is also due to Mr. Berry for his plan of forming Bog Bridges across his Drains, many of which are gravelled over, and ſtand remarkably well, as before-mentioned in my preliminary observation to these detailed Reports.

On the subject of Manures, the surrounding lands, particularly Galros, Douris, and Whigſborough, abound with excellent manuring and limeſtone gravels; Ballycollen and Cloghell does not afford such abundance of good materials, but however, a sufficiency of gravel can be had at almoſt every part of the surrounding country; and in the centre of Cloghell Bog, sand and gravel may be had within a few feet of the surface, as before ſtated.

On the whole, these Bogs are possessed of great capability for improvement, being by Nature subdivided into four parts, all having a gradual declination to their common outlet, and when intersected by the proposed Navigation Drains, they will be so advantageously laid open to the manuring and limeſtone gravels of the adjoining high lands, that these may be conveyed by land or water carriage to within 60 perches of the moſt internal part to be found in the whole of this Division, a circumſtance that is decidedly in favour of carrying into effect any future agricultural pursuits.

In the following Eſtimate I have given a detail of the particular Expenses of the separate Lines of Navigation and Main Drainage which I have recommended, all which I truſt will be found not to exceed the advantages likely to result from the object of reducing those Bogs to such a ſtate of consolidation, as will enable the practical improver to commence his operations.

ESTIMATE of Expenses necessary to execute the proposed Works on the Bogs of CLOGHEL, DOWRIS, GALROS, &c. &c.

No. of Section		s.	£.	s.	d.
74.	To 220 perches of Navigation Drain running between the Bogs of Galros and Cloghel, in the line of Mr. Berry's present Tap Drain, commencing at the Barony Bounds between Galros and Garhally (letter A) and ending at the wooden Bridge C, average 7 feet sinking - - - - - - - at	24/	264	—	—
	To 40 perches of D° - from said wooden Bridge along the Bog Road towards the gravel hills of Cloghel, average 11 feet sinking - - - - - - - - - - -	56/	112	—	—
	To 33 perches of D° - continuing to said hills, average 13 feet sinking - - - - - - - - - - -	69/	113	17	—
	To 586 perches of Back Drains for ditto - - - -	2/6	73	5	—
	To dressing down and forming Trackways on both sides 293 perches - - - - - - - - - - -	10/	146	10	—
	To 114 perches of widening and deepening Mr. Berry's Main Drain from end of said Navigation to the Bog of Ballycollen, average 10 feet sinking below the natural surface through clay and gravel, allowing for the Drain already made - at	15/	85	10	—
	To 79 perches of D° - through the Bog of Ballycollen to the Lough at E, average 9 feet sinking - - - - -	11/	43	9	—
	To 66 perches of D° - from the Lough towards the Hills of Whigsborough, average 9 feet sinking - - - -	11/	36	6	—
	To 44 perches of D° - ending at the point E, average 8 feet sinking - - - - - - - - - - -	7/3	15	19	—
75.	To 150 perches of Main Drain through the Bog of Cloghel from B to G, average 9 feet sinking - - - - - -	11/	82	10	—
76.	To 118 perches of Main Drain from B to H, average 9 feet sinking - - - - - - - - - - -	11/	64	18	—
77.	To 153 perches of deepening and widening Mr. Berry's Tap Drain from the point I to K, so as to sink it 5 feet deeper at the said point K, average 3 feet additional sinking - - -	5/	38	5	—
	To 229 perches of Catchwater Drain from said point K to the point F, under the Hills of Whigsborough and Galros, average 7 feet sinking, partly through clay and gravel - - -	6/	68	14	—
78.	To 14 perches of Main Drain through the Bog of Ballycollin, commencing near the point I, average 7 feet sinking - -	5/10	4	1	—
	To 34 perches of D° - to the point L, average 10 feet sinking	15/7	26	9	10
	To 110 perches of Navigation Drain, commencing at the point L and continuing to the Lake under the Hill of Ballycollin, average 12 feet sinking - - - - - - - - -	62/	385	—	—
	To dressing down Banks and gravelling Trackways on both sides, 220 perches - - - - - - - - - - -	5/	55	—	—
	To 220 perches of Back Drains for D° - - - - - -	2/6	27	10	—
	To 160 perches of 8-foot Receiving Drain through the Bog of Cloghel - - - - - - - - - - -	7/3	58	—	—
	To 124 perches of D° - in the Bog of Galros - - -	7/3	44	19	3
	To 220 perches of deepening and widening the present Catchwater Drain under the Lands of Galros - - -	5/	55	—	—
	To 186 perches of Catchwater Drain between the lands of Cloghel and the Red Bog, average 8 feet sinking - - -	7/3	67	8	6
	TOTAL for Navigation Main and Receiving Drains -	- £	1,868	11	7

Eſtimate of Expenses for the Bogs of Cloghel, Dowris, Galros, &c. &c.—*continued.*

No. of Section.			
		s.	£. s. d.
	To 1,500 perches of Surface Drains in the Bogs of Dowris, Whigsborough, and Ballycollin - - - - - - -	2/6	187 10 —
	To 667 perches of scouring present Drains in D° - - -	1/6	50 — —
	To 160 perches of scouring the Barony Drain from the point A towards the Road - - - - - - - - -	2/	16 — —
	To 880 perches of Surface Drains in the Bogs of Galros - -	2/6	110 — —
	To 1,200 perches of - D° - in the Bog of Cloghel - -	2/6	150 — —
	To 700 perches of scouring the present Drains in Cloghel Bog - - - - - - - - - -	1/6	52 10 —
	To 500 perches of Surface Drains in the Bog of Cons Park -	2/6	62 10 —
	To 700 perches of scouring present Drains - - - -	1/6	52 10 —
	To 300 perches of Surface Drains in the small Bog of Garbally - - - - - - - - -	2/6	37 10 —
	Total for Surface Drains - - - -	- £.	718 10 —
	Navigation and Main Drains brought over	- -	1,868 11 7
			2,587 1 7
	Contingencies and unforeseen Expenses, £.20 per Cent.	- -	517 8 4
	Total Amount for Tenth Division - -	- £.	3,104 9 11

ELEVENTH DIVISION:

Comprehending Glaster and Streamstown Bogs,

Containing in the whole 1,227 acres 3 roods 14 perches. 758 Iriſh.

THIS tract of Bog is situate within about one mile and a quarter of the River Shannon, near Banagher. It is the only Bog in this Diſtrict that lies under my point of data, the keyſtone of Macartney Aqueduct, and the depth in some parts is nearly as low as the level of the River Shannon below Banagher Lock, which I found to be 37 feet 8 inches below Macartney Aqueduct on the 8th of May 1810.

The great ventage for the waters of this Bog is the Stream from Ballaghanogher, by which it is entirely bounded on the eaſt side for a diſtance of two miles, with very little fall, after which it runs for about a mile and a half to Lissmuck Bridge, and falls into the Shannon below Banagher. This Stream, where it joins the Bog, is near thirty feet under the summit of it, but is however by one natural ſharp, subject to flood the paſture grounds along its banks: this impediment I propose to remove, by cutting a new course for 100 perches on a give-and take line, by which the River will be lowered, and the waters thereby prevented from rising to the height they now do in the winter time. The principal of this impediment is at the point B, where the water is in summer but 15 inches deep, whereas at a diſtance of 40 perches on either side, it is 5 or 6 feet deep in the drieſt season, and continuing so towards the Shannon, a water communication for small turf boats is opened from the north point of Glaſter Bog to Lessmuck Bridge, and which by removing the gravel ſharp before-mentioned, or cutting the proposed new course, may be extended above the Grand Canal Road, by means of which the gravels of Garra and Ballybuy can be transported across the River to the Bog.

The weſtern boundary of these Bogs is chiefly composed of high grounds, diversified with some abrupt hills of excellent manuring gravel, immediately adjoining the Bog and extremely convenient to forward the future improvement by means of the internal Cross Roads which I have laid out through the interior. The firſt of these Lines is laid out to run across the wideſt part of the Bog for a diſtance of 260 perches commencing at the Burrow Hills of Streamstown at the point A (near the Banagher Road) and proceeding across by the bounds between Giles Eyres and Garret O'Moore, Esqrs. till it meets the Boundary Stream at Garra at the point B. From the centre of this Road I propose a Cross Line, firſt along the summit of the Bog to the new Road made by the Grand Canal Company, and secondly across the Bog of Streamstown at Foolagh. These Lines of Road completely intersect the great mass of this Bog, by which its centre will be laid open to a communication with the surrounding country, and with the eaſtern Boundary Stream, from whence the aid of limeſtone and manuring gravels can only be obtained. On the south side of the proposed Road, from the Burrow Hills to the Stream at Garra, I propose to run my chief Line of Main Drain; I also propose a parallel Main Drain, at 80 perches diſtance, and of similar dimensions. The Sections of these laſt-mentioned Main Drains I have not found necessary to furniſh, there being little or no variation between the levels of them and the Section Line of Main Drain No. 82. These three Drains running in a central direction through the Bog, and being sunk in general from 8 to 12 feet below the surface, will be sufficiently low to allow an artificial fall for the 40-perch Surface Drains falling into them on each side, which fall could not otherwise be obtained, as the Bog from north to south approaches to nearly a dead level, and therefore the Surface Drains muſt be made 6 feet deep at their discharging points, and 4 feet at the extremity of them, thereby forming an artificial fall, as already described in the preliminary Observations to these Reports.

The interior of this portion of the Bog north of the Grand Canal Company's Road I found to be very wet, occasioned solely by its retention of the rain waters, there not being the leaſt appearance of any springs issuing from the high grounds by which it is commanded, nor any points where subterraneous waters are discharged from the Bog along the whole line of eaſtern ſtream by which it is bounded, except what comes down the Land Drain under Glaſter, and discharges at the southern extremity of the Bog, which Drain I propose to deepen the whole way to the point C, as described in Section No. 79. But I do not find it necessary to recommend any further continuation of Catchwater Drain from said point round the Bog towards Streamstown and Foolagh, the bounding high grounds and hills being composed of porous limeſtone-gravel, the waters of which are discharged on the opposite side into the Little Brusna, this River running nearly parallel to the weſt verge of the Bog at about a quarter of a mile diſtance. In the portion of this Bog, south of the Canal Company's Road, I do not propose any Line of Main Drain (except the one under Glaſter marked No. 79) it being in general tolerably firm, and only requiring the aid of good Receiving and Surface Drains. I have therefore judged it expedient to propose three parallel Lines of 8-foot Receiving Drains at a diſtance of a quarter of a mile, or 80 perches from each other; and also two parallel 8-foot Drains, one on each side of the Grand Canal Company's Road, at a diſtance of five perches from its centre, which I recommend, leſt by over drainage the Road ſhould slip and become dangerous, if not entirely impassable. Into these several Lines of 8-foot Drains (according to Section No. 81, which may serve to convey an idea of the levels of the whole, and which chiefly fall all the way from weſt to eaſt, emptying into the aforesaid Boundary Stream at Ballybuy and Garra) I have laid out such Cross Surface Drains as I truſt will be sufficient to reduce the whole to consolidation, and carry off the surface waters. The small detached Bog joining Aſhgrove is used as the chief supply of turf to the town of Banagher, which is principally carried by small boats to Lissmuck Bridge, as before-mentioned; in consequence of which I have not provided for its Drainage, as the object of cutting and rearing turf on that Bog is considered much more lucrative than could be expected from agricultural pursuits.

Of Improvements already effected in these Bogs, I do not find any thing material has been done on the actual uncut Red Bog, but that the tenantry are sensible of its capability when drained, is evident from the specimen I observed of about a quarter of an acre of the Red Bog, a ſhort diſtance south of the Grand Canal Company's Road, being levelled and prepared to receive manuring gravel, and from which, the man assured me, he did expect it would have produced a good crop of potatoes; but having reaped some advantages from former improvements of a similar nature, he was made to pay for the Bog he had thus reclaimed: Thus the fear of being again treated in the same way, prevented him from proceeding further than the ſtate of preparation it was then in.

However, on the cut-out Bogs of Streamstown there are ſome good examples of induſtry and improvement; there I observed some good crops of excellent rape and potatoes produced by spreading manuring gravel on the Bog, and by drawing the Bog-ſtuff or mooren on the uplands, a practice generally adopted in this country, without which their light gravelly lands would yield but a poor return for their labours, as has been already noticed in my preliminary observations.

In these Bogs, Irrigation cannot be obtained, there being no head of water that can be brought to command the general level of the surface, which circumſtance also precludes the desirable object of internal lines of Navigation, in lieu of which I have opened the interior by the Cross Roads already described.

The proprietors of this Division of the Bogs are Garret O'Moore and Giles Eyre, Esqrs. the bounds between whom run from the Burrow Hills to the ſtream at Garra, leaving the South, which is by much the largeſt Division, to Mr. O'Moore, and the North Division to Mr. Eyre.

In the following Eſtimate I have not only provided for the Main Drains, Roads, and Surface Drains, but also for deepening and taking down the Sharp of the Eaſtern Stream at the point B, which will materially improve the paſture ground on each side the whole way to Ballaghanocker, a diſtance of near two miles.

ESTIMATE of Expenses necessary to execute the proposed Works on GLASTER and STREAMSTOWN BOGS.

No. of Section		s.	£.	s.	d.
79.	To 440 perches of deepening and widening a line of Catchwater Drain under the Lands of Glaſter - - - - - at	4/	88	—	—
80.	To 100 perches of new course for the River at Garra, to be made 14 feet wide, 7 feet deep, and 7 feet bottom, at *6d.* per yard - - - - - - - - - - - -	28/	140	—	—
81.	To 110 perches of 8-foot Receiving Drain, from Glaſter to the ſtream at Ballyboy - - - - - - - - -	7/3	39	17	6
	To two more 8-foot Drains parallel to the above, at 80 perches diſtance, and falling into ſaid River at Ballybuy; the whole 220 perches - - - - - - - - - -	7/3	79	15	—
	To two parallel 8-foot Drains in a direction of the Canal Company's Road, five perches from the centre, 136 perches -	7/3	49	6	—
82.	To 264 perches of Main Drain, from the Burrow Hills to the ſtream at Garra, average 10 feet ſinking - - - - -	15/7	205	14	—
	To 300 perches of Main Drain, between the above and the Grand Canal Company's Road, through similar levels of the Bog, with the same average sinking - - - - - -	15/7	233	15	—
	To 230 perches of similar Main Drain, parallel to and on the North side of No. 82. at the diſtance of 80 perches - -	15/7	179	4	2
	To 264 perches of New Road, 14 feet gravel on the North side of Main Drain No. 82. - - - - - - - - -	15/	198	—	—
	To 264 perches of Drain along North side of Dº - - - -	2/6	33	—	—
	To 414 perches of Cross Roads, running from the centre of Main Drain No. 82, towards the Lands of Foolagh on the North, and the Canal Company's Road on the South - - at	15/	310	10	—
	To 28 perches of Road Drains on each side of Dº - - -	2/6	103	10	—
	To three large Wooden Bridges across Main Drains, at £. 30. each - - - - - - - - - - - -	- -	90	—	—
	Total for Main Drains, Roads, &c. - - -	- £.	1,750	11	8
	To 3,800 perches of Surface Drains in the Bogs of Glaſter and Streamstown, North of the Grand Canal Company's Road -	2/6	475	—	—
	To 300 perches of deepening and widening the present Drains along the Bog edge of Foola and Ballinasra - - - - -	1/6	22	10	—
	To 1,100 perches of Surface Drains, South of the Canal Company's Road - - - - - - - - - -	2/6	137	10	—
	Total for Surface Drains - - - - -	- -	635	—	—
	Main Drains and Roads - - - - -	- -	1,750	11	8
		£.	2,385	11	8
	Contingencies and unforeseen Expenses, £. 20. per Cent.	- -	477	2	4
	TOTAL AMOUNT for Eleventh Division - -	- £.	2,862	14	—

TWELFTH DIVISION:

Comprehending BALLYNAGUILSHA, CLONBEALYMORE, BALLYWILLIAMS, and CLONBRONE BOGS,

1,573 Iriſh.

Containing in the whole 2,548 acres.

THIS tract of Bogs, lying between Birr and Ballyboy, and between Birr and Killyon, commences about a mile and a half eaſt of the former town, and continuing on each side of the Road for a mile to Clonbealymore, ſtretches across to Coole and Killyon, and from thence to the Road from Birr to Killyon, which Road is the Southern Boundary for near a mile and half. It is from eaſt to weſt about two miles and a half long, and from north to south about two miles broad.

The summit of these Bogs, and the average surface for a great extent, lie generally from 70 to 87 feet above the keyſtone of Macartney Aqueduct, and the chief Taps or Outlets are—1ſt. The ſtreams to the Mill of Egliſh at Ballynagulsha and Cloncarbin. 2dly. The ſtream at Rathue and Clonbealybeg. And 3rdly. The Barony Stream between Liſhen and Clonoughell. There are also three or four secondary Outlets at Clonbrone, emptying into the Birr River, of which advantage may be taken to carry off the surface waters of the small Bog south of the Killyon Road, and also to communicate with the Northern Drain of said Road. There is also another Outlet at Ballywilliams, which, after running near a mile, eventually discharges into a small gullyhole at the Wood of Birr; but on examination I find that ventage nearly choaked up with the Bog-ſtuff, which is conſtantly carried down by the springs at the turf-holes of Ballywilliams, and it is at present scarcely sufficient to carry off the summer's waters; therefore, inſtead of encouraging a greater flow of water that way, I have formed a plan for diverting part of its present stream along the Road from Ballywilliams Bridge to Derrynamuck, and then turning along the Bog Road and falling into my proposed line of Main Drain No 90, at the point G.

On taking a view of these Bogs, commencing at Ballywilliams Bridge, and proceeding round the periphery of them towards Ballindown, you meet in the cut-away Bog the springs that issue out of the Bog-holes before-mentioned These springs are of a mineral nature, and are the most constant I have seen issuing from the bottom of a Bog; so much so, that even at this period of uncommon drought (June 1810) the streams running from them to the gullyhole at the Wood of Birr are almost sufficient to supply a mill; continuing towards Ballynagulsha Hills the Bog lies high and dry, with the exception of one or two sloughs at Ballindown. Under the Hills of Ballynaguilſha you again meet the same description of never-failing mineral springs issuing from the Bog-holes; and these I consider to be the head and source of those already mentioned at Ballywilliams. From this point at Ballinaguilſha there is a fall of near 30 feet in little more than half a mile to the Mill Stream at Egliſh Bridge; which point of ventage I propose as the Main Outlet for almoſt all the waters of the Bogs in this Division, being no less than 50 feet under the summit, and not less than 30 feet under any part of the surface of them. Continuing round by the lands of Cloncarbin you meet the Bridge on the Road from Birr to Ballyboy, from whence a ſtream runs to Eglish Bridge. This ſtream takes a moſt circuitous rout on the south and eaſt sides of Cloncarbin, as may be seen on the Map, and for the first half mile parallel to the Road it has but 4 feet fall. I would therefore propose to change the course of this stream altogether, by making a new cut of 118 perches long by the verge of the cut-out Bog of Cloncarbin, in which direction there can be obtained a fall of no less than 12 feet. This increased fall will admit the present bottom of Cloncarbin Bridge to be cleared out to the gravel, thereby deepening the bottom 5 feet lower without endangering the Bridge, as on examination I find the foundation is 5 feet lower than the present bottom, or 10 feet below the keystone.

The Road between Ballywilliams and Cloncarbin Bridge has sunk some feet below the natural surface of the Bog, and in many places the centre of it is actually below the bottom of the side Drains; in consequence of which the Road in winter is almost impassable. To remedy this evil I propose to bring up a Drain (from a proposed Main at Derrynamuck No. 90) along the Bog Road, and on the north side of the high Road to Ballywilliams Bridge, as described by Section No. 89. This Drain will carry off all the surface waters of the Bog above the Road, and the waters that now run through Ballywilliams Bridge will also be diverted this way, by Derrynamuck to Eglish, instead of running down to the gullyhole at the Wood of Birr, which is insufficient to receive its waters, as before-mentioned. The fall of the proposed Road Drain, from the bottom of Ballywilliams Bridge to the intended junction of it with Main Drain No. 90 at the point G, will be 6 feet in a distance of 208 perches, and by sinking the common ventage to Eglish Bridge may, if necessary, be increased to 30 feet; which gives a decided preference to carrying the waters of the Road by Derrynamuck rather than by Ballywilliams.

The stream passing under Cloncarbin Bridge rises in the centre of the Bog about a mile above said Bridge, and is a dead level for a great part of that distance. On the east side of this Stream Mr. Molloy, of Clonbealymore, has moſt judiciously effected the Drainage of about 170 acres of Red Bog, besides bringing into a profitable ſtate a great portion of Moor and Bottoms round the island of Cloneen.

The quantity of Drains which he found neceſſary are all marked on the Map, affording a good ſpecimen of the number that may be required for the Drainage of the whole: but however, we are to conſider that his Surface Drains were unaſſiſted by any Main Tap, and therefore the Bog required more of them than will be found requiſite when they are interſected by the great Main Drains propoſed. Mr. Molloy's Drains are not large but numerous, being in general from 3 to 5 feet deep; and the effect of them is ſuch, that the heavieſt beaſt may paſs over his Bogs in ſummer-time. However, his Main Outlet Stream to the Bridge is on too high a level to effect the Drainage of the cut-out Bogs adjoining; but I have no doubt the propoſed lowering the bottom of Clancarbin Bridge will completely remedy the evil. The remainder of the Bog to Coole, Cullane, and the Killyon Road, has little or no variety, being for the moſt part a dead level of very wet ſhaking Bog, with the exception of a portion near Cullane, which is firm, and interſperſed with many ſpots where abundance of gravel can be had within 5 or 6 feet of the ſurface, and which will be valuable acquiſitions in the future cultivation of theſe tracts; to diffuſe the benefits of which I have propoſed a Line of Navigable Drain from Cloncarbin Bridge to the Gravel Hills, with a pair of Sluices at the Bridge to let off the waters occaſionally. The average ſinking for this Navigation will be about 13 feet, and to contain 4 or 5 feet water, according to the height of the top of the Sluice over which the overflow of water will diſcharge itſelf. This Drain will end in about 5 feet of manuring gravel, and may be extended as far as the conſumption of gravel for the interior of the Bog may require. The want of a command of water at a convenient diſtance prevents me from propoſing a Navigable Line on a higher level.

The different Lines of Main Drains which I conceive neceſſary to effect the Drainage of theſe Bogs are marked on the Map, and alſo the ſeveral Lines of 8-foot Receiving Drains falling with the natural declination of the ſurface; theſe Drains, together with a Catch-water Drain to intercept the ſprings of Ballynaguilſha, are all the Drains of large dimenſions that I think neceſſary to recommend, and which, with the Surface Drains alſo marked on the Map, will, I truſt, be ſufficient to reduce the whole to a ſtate of ſolidity fit to receive agricultural improvements.

The firſt of theſe Drains, as deſcribed in Section No. 83, is a propoſed Main Drain through the Bogs of Coole, Clonbealymore, and Rathhue, commencing at the Navigation Line at A, and taking a central courſe through ſaid Bogs for 400 perches, with a Saddle-fall of 14 feet to the ſaid Navigation Line, and 20 feet to the junction of the ſtreams at Rathhue. No. 84 is a Line of propoſed Main Drain commencing at the end of the Navigable Line at A, and running on the gravelly under-ſtrata in the ſhallow Bog of Cullane to the point B, from the termination of which it is propoſed to be continued till it forms a junction at C with Main Drain No. 88, near the Killyon Road. No. 85 is the propoſed Navigation Line from Cloncarbin Bridge to the head of ſprings in the centre of the Bog at A, where it will receive the waters of Main Drains Nos. 82, 83. and 87, from which point I have continued ſaid Line as a Main Drain through the high Red and Shaking Bog as far as the preſent Protection Drain of Liſheen turf banks, the fall of which to the point A, will be eighteen feet to the bottom of the propoſed Navigation, which is intended at that point to be four feet under the preſent bottom of Cloncarbin Bridge. On the Section of this Line I have ſhewn the levels of the preſent circuitous courſe of the Stream to Egliſh Mill, in order to have a comparative view of the propoſed alteration in its courſe, as ſhewn in Section No. 86. I have alſo deſcribed the level of the bottom of the Bridge of Egliſh Mill Stream, being the point of ventage where almoſt all the waters of the propoſed Drains will be eventually diſcharged; and I have ſhewn the fall of the Outlet Stream between the Baronies of Ballybrit and Egliſh, and falling into the Birr River at Syngefield, which is alſo deſcribed in Section No. 88.

The Line of Section No. 86, is a propoſed Plan for turning the preſent courſe of the Stream from Cloncarbin Bridge, ſo as to convey the waters in the ſhorteſt line to Egliſh Mill Stream, having a fall of 16 feet 6 inches in 250 perches, and by which the courſe of the Stream is ſhortened 120 perches. The Line No. 87 is a propoſed Receiving Drain through the centre of the Bog of Ballywilliams, and diſcharging into the Navigation Line at the point A. And the Line of Main Drain No. 88, being the laſt in the Bog ſouth of the Road to Ballyboy, is propoſed to commence at Cullane Bridge, near Killyon, and continuing on the north of the high Road, turns along the Bog Road to D, from which point it runs through the Red Bog nearly parallel to the Killyon Road, and at 80 perches diſtance from it, till it falls into the Barony Stream at Clonoughel. At the junction of this Main Drain with the Line of Main Drain No. 84, at the point C, the fall is intended both ways, firſt to Cullane Bridge 12 feet fall, and the main run to the Barony Stream 30 feet to the point E, and the ſinking through ſhaking Bog for 10 to 15 feet for the diſtance of 350 perches; all which is deſcribed in Section No. 88.

No. 89 is the Line of Section of propoſed Drain along the north ſide of the Road from Ballywilliams to Derrynamuck, by which the water will be brought from Ballywilliam Bridge along ſaid Line, and diſcharged into Main Drain No. 90, at the point G. And the Lines No. 91 and No. 92 are two propoſed Main Drains through the Bogs of Ballindown and Ballynaguilſha, all which will eventually diſcharge their waters into the propoſed new courſe of the Stream at the point H, and which are the laſt of Main and Receiving Drains I recommend in all this Diviſion of the Bogs.

On the ſubject of Irrigation, I find all the ſtreams connected round theſe Bogs are ſo conſiderably under the general ſurface of them, as to preclude the poſſibility of having a command of water at a convenient diſtance for that purpoſe; nor do I ſee that it is at all practicable, except by increaſing the ſtream from Munny and Thomastown, which may be done by the acquiſition of the Mountain Stream at Mr. Drought's, of Lettybrook. This Stream I have already recommended to be taken into the Navigation Drain through the Bog of Derrinboy (as mentioned in page 104) after ſupplying which, the redundant water may diſcharge into the Munny Stream to Thomastown, where it can be taken up at a proper level and conveyed along the high grounds to Coole, and there fall on the ſummit of the Bogs of Clonbeale, &c. from which it may be carried all over the Bogs ſouth of the Road from Birr to Ballyboy. It would however be difficult to extend the benefits of Irrigation from this ſource to the Diviſion of Bog north of the Road to Ballyboy, which could only be done by expenſive embankments, and an Aqueduct to convey the water acroſs the Road, and therefore I have only to recommend the Main Drains No. 90 and 91, to be dammed up in proper ſeaſons ſo as to reſerve a ſufficient ſupply of water in ſummer time.

The Killyon Stream I did hope could be brought in on a ſufficiently high altitude, but on taking the levels of it, I found it could not be taken up in leſs than a diſtance of three miles, and in the demeſne of Drought Ville, from which there is but one paſs to convey the level into the Bog, and this for a great part of the way ſhould be on the verge of ſteep hills of running gravel, on the north ſide of the preſent ſtream, from the nature of which it would be almoſt impoſſible to ſtaunch the line of watercourſe, which being run through ſuch materials would be conſtantly ſlipping in; the conſequence would be, that the ſtream being a mountain one, would in flood make its paſſage over thoſe defective parts, and carry away all before it.

Theſe conſiderations, which I conceive important, induced me to abandon the Killyon Stream, and to recommend the increaſe of the ſtream at Thomastown, which can be brought to the Bog in a run of leſs than two miles, and at a moderate expenſe.

With reſpect to Manures, I find the whole country ſurrounding thoſe Bogs to abound with excellent limeſtone and manuring gravels; but nothing of the kind can be had in the interior, except at the ſpots near Cullane before-mentioned, which, by the propoſed Navigable Line and the Croſs Roads, may be pretty generally diffuſed through the Bog.

The greateſt portion of this Diviſion of Bogs are the eſtate of the Earl of Roſs, and on theſe his Lordſhip has made thoſe experiments alluded to in my preliminary obſervations. There are alſo not leſs than ſeven or eight other claimants, among whom are, John Caſſidy, Manyfold, Molloy, Thomas Berry, J. H. Moore, and Thomas Bennett, Eſqrs. very few of whom have aſcertained the extent of their Bog property, and therefore it muſt be conſidered as an undivided Commonage, the probable Expenſes for the Drainage of which I have given in the following Eſtimate.

ESTIMATE of Expenſes neceſſary to execute the propoſed Works on BALLYNAGUILSHA, CLONBEALYMORE, BALLYWILLIAMS, and CLONBRONE BOGS.

No. of Section.		s.	£.	s.	d.
83	To 120 perches of Main Drain, commencing at the point A, and directed through the Bogs of Clonbealymore and Cullane, average 15 feet ſinking - - - - - - - at	40/	240	—	—
	To 80 perches of Dº - average 12 feet ſinking - - -	24/6	98	—	—
	To 120 Dº - - Dº - Dº - 11 - Dº - - -	18/2	109	—	—
	To 40 Dº - - Dº - Dº - 13 - Dº - - -	28/	56	—	—
	To 40 Dº - - Dº - Dº - 15 - Dº - - -	40/	80	—	—
	To 40 Dº - - Dº - Dº - 12 - Dº - - -	24/6	49	—	—
	To 92 Dº - - Dº - through cut-away Bog - - -	3/6	16	2	—
84.	To 98 perches of Main Drain cut down to the under ſtrata, average 15 feet ſinking - - - - - - - -	40/	196	—	—
	To 120 Dº - - Dº - average 13 feet ſinking, and ending at point C - - - - - - - - - -	28/	168	—	—
85.	To 114 perches of Navigation Drain commencing at Cloncarbin Bridge, average 11 feet ſinking, at 4*d.* per cubic yard - or	56/	319	4	—
	To 140 Dº - - Dº - in Red Bog ending at A, average 15 feet ſinking - - - - - - -	83/6	584	10	—

Eſtimate of Expenses neceſſary to execute proposed Works on Ballynaguilſha Bog, &c.—*continued.*

No. of Section			£.	s.	d.
	To 508 perches of Back Drains - - - - - - at	2/6	63	10	—
	To a pair of framed Sluices at Cloncarbin Bridge, to let off the level occaſionally - - - - - - - - -	- -	15	—	—
	To 40 perches of Main Drain from the point A through the centre of the Bog, average 14 feet sinking - - - -	32/	64	—	—
	To 120 perches of D° - average 12 feet sinking - - -	24/6	147	—	—
	To 106 D° - of D° - - D° 9 feet D° - - -	11/	58	6	—
	To 54 D° - of D° falling into the Barony Stream, average 6 feet ſinking - - - - - - - - - -	3/6	9	9	—
86.	To 130 perches of propoſed new courſe for the ſtream from Cloncarbin Bridge along the bounds of ſaid lands, deepening and widening the present Drain to 3 feet at bottom - -	3/	19	10	—
	To 18 perches of D° - in cut-away Bog, average 6 feet ſinking - - - - - - - - - - -	3/6	3	3	—
	To 40 D° - of D° - average 10 feet sinking - -	15/7	31	3	4
	To 60 D° - of D° - D° - 13 feet D° - - -	28/	84	—	—
	To a pipe on the Road at Watkins's - - - - -	- -	5	—	—
87.	To 200 perches of Main Drain running from the point A through the Bog of Ballywilliams, average 10 feet sinking -	15/7	155	16	8
88.	To 40 perches of - D° - commencing at E, and running through cut-away Bog, average 6 feet sinking - -	3/6	7	—	—
	To 30 perches of - D° - in Red Bog, average 11 feet sinking - - - - - - - - - - -	18/2	27	5	—
	To 120 perches of - D° - in Shaking Bog, average 15 feet sinking - - - - - - - - - -	40/	240	—	—
	To 120 perches of - D° - average 13 feet sinking -	28/	168	—	—
	To 72 perches of - D° - - - 12 - D° - -	24/6	88	4	—
	To 30 perches of - D° - - - 9 - D° - -	11/	16	10	—
	To 20 perches of - D° - along the Bog Road to the Killyon Road, at 6 feet sinking - - - - -	3/6	3	10	—
	To 78 perches, scouring the present Road Drain to Cullane Bridge - - - - - - - - - - -	1/6	5	17	—
	To a new Pipe at said Road - - - - - - -	- -	5	—	—
89.	To 145 perches of deepening and widening the present Northern Road Drain, from Ballywilliams Bridge to the Bog Road at Derrynamuck, making it on an average 7 feet deep - - - - - - - - - - -	4/	29	—	—
	To 65 perches of Drain, from the High Road at Derrynamuck to junction with No. 90 at the point G, average 7 feet sinking in the cut Bog - - - - - - - - -	5/10	18	19	2
90.	To 162 perches of widening and sinking present Drain, from the point H at Cloncarbin, to the point G at the Bog Road of Derrynamuck, average 7 feet sinking - - - - - -	5/	40	10	—
	To 80 perches of - D° - through Red Bog, average 12 feet sinking - - - - - - - - - - -	24/6	98	—	—
	To 80 - D° of - D° - average 9 feet - - - -	11/	44	—	—
91.	To 26 perches of Main Drain between Ballynaguilſha and Derrynamuck Bogs, average 6 feet sinking - - - - -	3/6	4	11	—
	To 234 perches of - D° - in the Red Bog, average 10 feet sinking - - - - - - - - - - -	15/7	182	6	6
	To 254 perches of new Road, 14 feet gravel on the weſt side of propoſed Canal from Clonbealymore Bridge to the point A. - - - - - - - - - - -	15/	190	10	—

Eſtimate of Expenses neceſſary to execute the propoſed Works on Ballynaguilsha Bog, &c.—*continued.*

No of Section.		s.	£.	s.	d.
91.	To 282 perches of new Road, from the point A, along Main Drain No. 84, and into the Killyon Road at Clonbrone -	12/	169	4	—
	To 280 perches of D°, through the Bog of Clonbrone from the point C, along Main Drain No. 88 - - - - - -	15/	210	—	—
	To 300 perches of new Road across from Cullane towards Litheen - - - - - - - - - -	15/	225	—	—
	To 1,162 perches of Road Drains - - - - - -	2/6	195	5	—
	To 400 perches of 8-foot Receiving Drains - - - -	7/3	145	—	—
	To 8,200 perches of Surface Drains - - - - -	2/6	1,025	—	—
	To 5 wooden Bridges across Main Drain - at £. 30. per	- -	150	—	—
		£.	5,850	5	8
	Contingencies and unforeseen Expenses, at £. 20 per Cent.	- -	1,172	1	1
	TOTAL Amount for Twelfth Diviſion	- £.	7,032	6	9

THIRTEENTH DIVISION,

Comprehending THOMASTOWN and DOUGHILL BOGS.

THIS laſt Diviſion of the Bogs to which I have the honour to draw your attention, is ſituated on the Road between Birr and Frankford, at a diſtance of about two miles from the latter town, and contains, of actual Red Bog 612 acres 2 roods and 25 perches, and of improved Bog and Moors 125 acres 2 roods and 6 perches, which are now in a profitable agricultural ſtate. Of the above 612 acres 2 roods 25 perches there are 116 acres 2 roods and 20 perches detached from the great mass, between which intervene the improved Bogs and Moors already mentioned. The great Diviſion of theſe Bogs, which belong to Thomastown and Doughill, is of a very even ſurface, not higher than 10 feet from the ſurrounding bottom grounds, and its greateſt depth does not exceed 21 feet. There is every capability of effecting its drainage; the waters on the eaſt paſſing through the pipe at Ballincard, fall towards the Frankford River, and thoſe on the weſt run down the Mearing of Thomastown to the Pound of Egliſh, and eventually diſcharge into the Mill Stream near Egliſh Bridge, which I find an excellent Tap for this as well as the Bogs contained in the 12th Diviſion. There is a fall of 12 feet from the Pound of Egliſh (which is my propoſed level of ventage) to the Mill Stream at Egliſh Bridge. From this point of ventage at the Pound of Egliſh, which is 16 feet under the ſummit of the Bog, I propoſe to bring up my Main Tap to the point A, where the principal lines of Drainage will be united.

The firſt and Main Line of Drain is a propoſed Central Navigation Line commencing at the point A, and proceeding through the Bog to the high Road near Ballincard, according to Section No. 92, with an off branch communicating with it, and running along the Bounds of Thomastown, by which a ſupply of water and gravel can be obtained from the high grounds of Thomastown and Doughill, as appears by Section No. 94. Theſe Navigable Lines, in the firſt inſtance, may be formed to operate as Tap Drains, into which the greateſt portion of the Surface Drains will diſcharge themſelves; and after reducing the whole to conſolidation, they can then be completed on the navigation ſize for the conveyance of manuring gravel, &c. to the interior. I have, however, eſtimated thoſe Main Drains to the navigation ſize, being confident that the ultimate agricultural objects cannot be carried into effect without being able to diffuſe the manures which the ſurrounding country affords; and, as I before obſerved, wherever I find Navigable Drains attainable I think it proper to recommend their adoption.

The ſecond Line of Drainage which I propoſe for thoſe Bogs is a Catchwater Drain, commencing at the before-mentioned point A, and continued round the verge of the Bog to cut off the ſprings and drain the ſloughs at the edge of the lands of Thomastown; in this Line there is already a Drain made by the late Mr. Bennet; it is nearly wide enough, but was never ſufficiently ſunk, I therefore propoſe to lower it the whole way from the point A to the Navigation Line at E, where there may be erected an Overfall to carry off the redundant water which it will receive at this point, from which the Drain may be continued towards the point F, for a ſupply to the Navigation; the whole waters of which may be occaſionally run off by a Sluice, propoſed to be erected at the point B.

There have been many Drains made in this Bog, which being neglected, are now almoſt useless and of no effect; their not having been sufficiently deepened and laid out with proper falls has also rendered them inefficient, so much so, that when examined by me there was not a drop of water to be found in them, although the Bog was evidently in a very wet ſtate immediately under the surface. Near the centre of this Bog there is a large and ſteep hill containing above 8 acres, which I am sorry to find, is not formed of better materials (being chiefly composed of poor running gravel and sand) as its contiguity to the interior would have rendered it a valuable acquisition; however, the want of good materials in this island is in some degree compensated by the proposed Navigable Drain, from which any part of the interior may be abundantly supplied. There is another small Island in this Bog called Derrinakirk, nearly opposite the springs of Thomastown, which, although hardly visible from the land, is however composed of excellent gravel, and the Bog being very ſhallow round it would yield a portion of manure peculiarly serviceable in this spot.

The detached piece of Bog opposite Davidstown, containing 116 acres 2 roods and 20 perches, I would propose to intersect with Surface Drains only, being already surrounded with two excellent Taps, one falling to Curraghmore Mill and the other to the pipe at Ballincard. I would also recommend securing such of the Drains as would be necessary to carry off the waters more effectually from the cut-out Bogs and Moors, which would increase their value, and bring a considerable portion into profit, which are now perfectly uncultivated. The general appearance of this Bog in many places is of such description as would repay the improver if drained and gravelled; and at this moment I consider that about one-tenth portion of it is dry enough for ploughing and producing immediate crops. Some parts of the cut-away Bog, and a small portion of the Red Bog, are actually under improvement; one spot in particular of the Red Bog, where it was ſhallow, has a crop of oats that looked tolerably well, considering the dryness of the season in which I viewed it; and it was brought to that ſtate by gravelling the surface and planting a crop of potatoes.

The proprietors of these Bogs are Lord Ross, Mr. Bennet, Mrs. Molloy, and Mr. Shannon; but there are no particular mearings in the Bog by which the property of each person is ascertained.

ESTIMATE of EXPENSES necessary to execute the proposed Works on the Bogs of THOMASTOWN and DOUGHILL.

No. of Section.	———				
92.	To 236 perches of sinking Tap Drain, from the Pound of Egliſh to the point B, average 2 feet additional sinking - - at	s. 4/	£. 47	s. 4	d. —
	To 126 perches of Navigation Drain, average 9 feet sinking, at 3*d.* per yard - - - - - - - - or	32/3	203	3	6
	To 160 perches of - - Dº - - - - 14 feet sinking, at 4*d.* per yard - - - - - - - - or	£. 3. 16.	608	—	—
	To dressing down Banks and forming Trackways for 572 perches - - - - - - - - - -	5/	143	—	—
	To 572 perches of Back Drains - - - - - -	2/6	71	10	—
	To a double Sluice at the point B. - - - - - - -	- -	15	—	—
93.	To 200 perches of deepening and widening present Drain from A to E, so as to form a good Catchwater Drain under the lands of Thomastown - - - - - - - - -	5/	50	—	—
	To continuing said Drain under the springs of Doughill, to act as a supply to the proposed Navigation, 100 perches, average 7 feet sinking - - - - - - - - -	5/10	29	8	4
94.	To 64 perches of Cross Navigation Line from the point C to the springs of Doughill at E, average 12 feet sinking, at 4*d.* per yard - - - - - - - - - -	62/	198	8	—
	To Dressing down Banks and forming Trackways for 128 perches - - - - - - - - - -	5/	32	—	—

96.

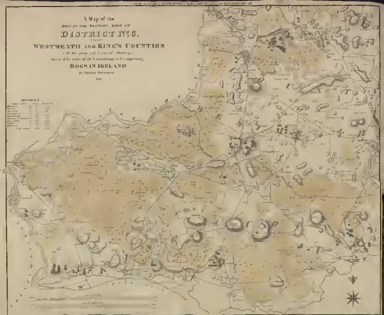
(continued.)

Eſtimate of Expenses for the Bogs of Thomastown and Doughill—*continued.*

No. of Section.					
		s.	£	*s.*	*d.*
94.	To 128 perches of Back Drains - - - - - -	2/6	16	—	—
	To erecting an Overfall at the point E - - - -	- -	5	—	—
	TOTAL for Navigation and Main Drains - - -	- -	1,418	13	10
	To 1,200 perches of widening and sinking the present Drains -	1/6	90	—	—
	To 2,500 perches of Surface Drains - - - - -	2/6	312	10	—
	TOTAL for Surface Drains, &c. - -	- -	402	10	—
	Navigation and Main Drains - - -	- -	1,418	13	10
		£.	1,821	3	10
	Contingencies and unforeseen Expenses, £.20 per Cent.	- -	364	4	9
	TOTAL Expense for Thirteenth Division -	- £.	2,185	8	7

Dublin, 67, Grafton-ſtreet,
30th October 1810.

J. Longfield.


A Map of the
Bogs in the Western Side of
DISTRICT No. 6.
in the
WESTMEATH AND KING'S COUNTIES
with the proposed Lines of Drainage
Surveyed by order of the Commissioners for improving
BOGS IN IRELAND
by Thomas Townsend
1811
REFERENCE

Appendix, No. 7.

The REPORT of Mr. THOMAS TOWNSEND; in Diſtrict No. 6.

To the COMMISSIONERS for Draining and Improving Bogs in Ireland.

Gentlemen,

IN reporting to you on the practicability of draining and improving the Bogs in the diſtrict No. 6, I beg leave to offer a plain ſtatement of the plan which I have laid down, and the mode which, in my humble opinion, seems beſt calculated to attain the desired end; together with other matters relative to the proposed business, conformably with the inſtructions I had the honour of receiving.

The reclaiming of extensive Bogs is a moſt intereſting subject, and almoſt new in this country; much induſtry, perseverance and time, will be required to complete them; the articles of inſtructions given by the Commissioners, are such as would naturally present themselves on the firſt consideration; and these, together with the liberal principles on which they are conducted, cannot fail to produce the moſt ample discussion and inveſtigation in every diſtrict.

The River Shannon, from Shannon Harbour to the conflux of the River Inny at Lough-Ree, is the weſtern boundary of this diſtrict, the River Inny to Bainalack the northern, from Bainalack to Lough-Ennel the eaſtern, and the River Brusna to its conflux with the Shannon is the southern boundary; the quantity of Bog is 21,298 acres 2 roods and 13 perches Iriſh, or 34,500 acres and 29 perches Engliſh, exclusive of a great number of Bogs less than 500 acres each, the situations of which are ſhewn on the Map.

The principal part of the Bogs are situate on the southern and weſtern boundaries; the River Shannon is the loweſt level in the diſtrict, and at Shannon bridge is 104 feet above high-water mark in Dublin; Mayvoughly north of Moat is the higheſt Bog, being 170 feet above the Shannon.

From Shannon Bridge to Balnahown is one continued Bog; a small River called the Black Water, and several small ſtreams running into it, intersect the Bogs, and from the general divisions the ſurface varies in height from 10 to 58 feet above the level of the Shannon, not being flat like fens or marſhes, but forming hills and vallies, some parts hard and firm, others wet and swampy; generally speaking, it is a soft red Bog, with a few very small Derries or Islands, as ſhewn on the Map; a Lake of 117 acres, called Lough Fanlough, situate on the north side, the surface of which is 16 feet higher than the Shannon, and another very small one, two acres three roods, called Lough Nug, 32 feet above the Shannon; theſe Lakes have no apparent supply or source but what falls from the higher parts of the Bogs.

The depth of the Bog or Peat in the interior averages about 30 feet, a few borings were made of 40 and 44 feet; under the bottom of the Bog is a ſtratum of clay, marl, or fine sand, from two inches to three feet thick, but in general it is about six or eight inches, the whole reſting on a bed of ſtrong clay and gravel, except in a few places I apprehend there may be rock.

These Bogs are surrounded by dry hills of limeſtone, gravel, and sand, all very fit for manuring and fertilizing the Bogs after being drained; there are also limeſtone quarries adjoining, and limeſtone round the entire Bogs; but few springs are to be met with, and thoſe very diminutive. The higheſt level is near the eaſtern extremity, and the fall is to the Blackwater River.

The Boggawn of Monfan is a long narrow Bog between two ridges of limeſtone gravel hills; the eaſt end of it adjoning Ballyduff is 47 feet above the River Shannon, and the weſt end near Seven Churches 18 feet; this is a soft red Bog, the depth from 15 to 35 feet; the fall is towards the Shannon.

Bloomhill Bog lies on the north side of the laſt-mentioned one; on its weſtern boundary is the River Shannon; it is similar to the Blackwater Bog before described; the surface varies much in the levels, some parts being nearly as low as the Shannon, and others 44 feet higher; a few very trifling ſtreams run down the vallies or low places to the Shannon; the borings in the interior are from 21 to 30 feet deep; in the centre of this Bog is a large Island or Derry called Bloomhill, containing about 236 acres of excellent ground, the higheſt elevation 90 feet above the Shannon.

The valley and River of Newtown divides Bloomhill and Clonbunnagh; the mearing between the King's County and County Weſtmeath runs across Bloomhill Bog.

The surface of Clonbunnagh Bog is tolerably even, and is from 28 to 36 feet higher than the Shannon; except juſt near the exterior edges, it falls off abruptly towards the Rivers surrounding it; the borings were 20 to 34 feet deep.

There is a small valley and River between Clonbunnagh and Bunnahindley Bogs.

Bunnahindley Bog is to the northward of the laſt-mentioned one, and extends nearly to the town of Athlone; along the banks of the Shannon the level of the Bog is between 18 and 38 feet above the River, the borings are from 23 to 33 feet deep; the surface of the Bog has a gradual descent to the River; a considerable tract near the town has (by degrees) been reclaimed; it appears that at the time of the Down survey, this Bog contained 1,173 acres, it is at present 666 acres; a great extent of the red Bog has been improved.

Moyclare and Endrim Bogs are situate near Ferbane, having the hills of Endrim and Clonfine to the northward; between these and Blackwater Bogs the levels are from 53 to 97 feet above the River Shannon, the borings from 18 to 26 feet deep; the fall from one part of the surface is to the Blackwater, and from the other to the River Brusna.

Lamonahan Bog is between Ferbane and Ballycumber, in the King's County; on the north side are the high hills of Corr and Thumbeagh; the River Brusna is near the southern extremity; near the middle is a valley, and a very small ſtream; a few Derries or Islands are on the eaſtern and weſtern boundaries; the road from Ferbane to Ballycumber runs acroſs it; the surface of this Bog is from 43 to 86 feet above the River Shannon, the borings from 15 to 32 feet deep; the fall of the greateſt part is to the Brusna, and of a small part at the weſt side to the Blackwater.

Bellair and Mountprospect Bog lies northward of the laſt-mentioned; one portion is in the King's County, and another in the County Weſtmeath; the higheſt level is opposite Bellair Hill; the fall from the eaſt end is towards the River Brusna, and from the weſt side to the Newbridge river, which runs through Newtown into the Shannon; the surface of this Bog is from 63 to 110 feet higher than the Shannon, the borings from 15 to 42 feet deep, soft bog; the road from Ballycumber to Moat runs along the weſtern side.

John Holmes, Esquire, of Mountprospect, has planted fir trees on part of this Bog, adjoining his eſtate, and has made Drains on the surface of large tracts, with an intention of planting and improving them.

Creggan and Willbrook Bog, situate about two miles eaſt of Athlone, is of a very irregular ſhape; the lands of Crosswood nearly separate it into two divisions, and there are several points of land which run a considerable way into it; Willbrook demesne bounds the weſterly side; the surface is from 66 to 105 feet above the level of the Shannon, the boring from 21 to 47 feet deep; the descent from the weſterly end is to the Shannon, and the eaſterly end to a small River which runs into Lough-Ree.

Travers Adamson, Esquire, has planted fir trees, and made surface Drains on a part of this Bog, near Corr.

Moyvoughly Bog is situate about half a mile north-eaſt of Moat a Grenogue; the surface is from 133 to 171 feet higher than the Shannon; the fall from the south side is towards the River Brusna, and the weſt side to the Shannon at Lough-Ree, and from the eaſt towards the Inny; the road from Moat to Mullingar crosses it.

Ballymaglavey Bog lays between Mayvore and the River Inny, one part is in the County Weſtmeath, and the other in the County Longford; the level of the Inny where it joins this Bog is 78 feet, and the higheſt part of the Bog 150 feet above the River at Shannon Bridge; the borings from 17 to 43 feet deep; the surface has a gradual descent towards the Inny; the road from Abbyshrule to Mearscourt crosses it, and a small ſtream, called Blackwater takes its course through the eaſterly point to the Inny.

There are numerous small Bogs in this diſtrict which do not come within the limits prescribed by the Commiſſioners, although there are many containing several hundred acres; the Map ſhews the situations.

I have endeavoured as much as possible to follow the inſtructions of the Commissioners, in having the main Drains in such directions and on such levels "as to allow the collateral "Drains communicating with them, to embrace the greateſt extent of surface the nature of "the Bog will admit of," and so that they will all be navigable Drains, both for the purposes of making every part serviceable in the general drainage, and also to afford equal convenience and accommodation for the conveyance of manure, gravel, &c. and the future produce of the Bogs after they ſhall be reclaimed.

The spaces on each side the main Drain and collateral Cuts can very easily be drained by common Drains, six feet wide at top and four feet deep, which will not incur more expense than the merely making proper fences for inclosing and dividing it into fields for the convenience of occupation; and the Cuts are so laid out, that the intervening space seldom exceeds eighty perches in width, and a communication is left open to the adjoining land, without ever having to cross any of them; so that, altogether, the access to every part of the Bog will be rendered perfectly easy and convenient.

For the present I would not advise the making of roads across these Bogs, because they would interfere with and obſtruct the principal Drains, without being conducive of any advantage or convenience more than the Drains will give; but if, after the Bogs are improved, any of the small collateral Drains should fall into disuse, or that roads in any particular directions ſhould be considered more convenient or preferable, it will be full time to make them, and the materials can be brought in boats at a very moderate expense; the exiſting roads muſt be preserved by making bridges over the proposed Drains where requisite.

In determining on the levels beſt suited to these Bogs, I have calculated on the surface of the water in the proposed Drains to be at leaſt on an average two or three feet below the surface of the Bog in Summer, when there is five feet depth of water in the Drains; and I propose to make Sluices and Overfalls on every Level or Reach, in convenient places, where there is a natural fall towards the Shannon or any other River, for discharging the surplus water in times of heavy rains, and also for the purpose of drawing off the water in the navigable Drains, so as to reduce the depth to three feet only, if necessary, in the Winter season; the surface of the Bog will then be four or five feet above the level of the water in the Drains, and the depth of water will ſtill be sufficient for the boats.

The difference of level between the surface of the Bog and the surface of water in the Drains will, I hope, be fully sufficient to answer the purpose of agricultural improvements, and the proposed regulations of Winter and Summer levels will (in compliance with the inſtructions of the Commissioners) prevent the inconvenience of a want of water in dry seasons, for the purpose of promoting vegetation, and for the use of cattle, and also for the purpose of irrigation, where the descent from the Drains will admit of it.

Should some parts of the Bog subside, so as to bring the surface too near the level of the water in the Drains, they may be re-sunk; and although that will cause a trifling interruption to the boating business for a short time, yet I would prefer it to the risk of sinking deep Drains at the commencement, because of their being liable to collapse, if made very deep: it is, however, probable, that by this plan of keeping up the water to within a few feet of the surface of the Bog, it will not subside much more than the depression which burning the top sod, or any other mode of reclaiming, may cause, the effect of which will be ascertained in the early progress of cultivating the Bogs, and perhaps may not be of any great magnitude; but, in order to guard againſt these casualities, it will be proper to make the foundations of the Locks and Bridges two or three feet deeper than would otherwise be necessary, and also to mark out the Drains deeper in the soft than in the hard firm parts of the Bog.

Where the excavation much exceeds the depths before-mentioned, or that in the opinion of the Commissioners an unreasonable expense may be incurred in the cutting of deep Drains, they may be poſtponed until the other parts of the Bogs are improved; in the mean time turf or peat can be cut on the sites where they are laid out, and a little progress made every Summer, towards completing them, at an easy expense.

A few of the small Drains in the low parts of the Bogs are carried out as far as the level will at present admit of; but if the Bog ſhould subside so as to affect these ſhallow Drains, after the manuring and gravelling is done on each side, if they cannot ultimately be dispensed with, a Dam may be made across them until there is a necessity for re-sinking the others, and afterwards they will be permanent.

The Commissioners direct, that where the main Drains are likely to be used as Canals, they are not in any inſtance to be less than fourteen feet broad at bottom, and five feet deep from the water surface; accordingly I have eſtimated the principal lines of Canal at those dimensions, and 29 feet wide at water surface; but the collateral Drains are calculated only 7 feet broad at bottom, 22 feet at top, and 5 feet depth of water, with a few wide places, where necessary, for the boats to pass each other; and as the uses of these small Canals will in a great measure be limited to the places immediately adjacent, (having no thoroughfare) they will be sufficient for the purpose if made wide enough to admit one boat, and to receive the drainage water from the surface of the Bogs, with proper Overfalls for discharging the rain or flood water. I venture to recommend this alteration, for the sake of economy, and under the idea of these smaller Canals being fully adequate for the purpose of navigation and drainage, if made according to the above dimensions.

I propose to take in several streams from the adjoining lands, in addition to the soakage from the Bogs, to insure a sufficient supply of water in all seasons; the ſtreams near Wilbrook and Moat Bogs are on the summit level of the Drains, and will be a principal supply for the Locks, as they all descend from that to the Shannon.

The rises of the Locks are made to answer the levels of the surface of the Bogs, which account for some being greater than others; but in the prosecution of the drainage, the rises and situations of the locks may admit of further improvement.

The River Shannon being navigable, I considered it indispensable to form a connecting line between it and the Drains, coinciding with the inſtructions of the Commissioners; viz. to keep in view the practicability of making future communications with the great lines of navigation already exiſting.

I have also taken levels to the Grand Canal, and by comparing them with the levels and sections of the Bogs, I find the level of Belmont Lock near Ferbane, will nearly answer to the proposed Drains through the middle of the Blackwater Bogs, and so on to Athlone, the main Drain can be carried to that town without Locks; and to this extension I ſhould imagine the Grand Canal Company would gladly contribute: this line of communication will be more expensive than the one laid out to the Shannon, but it would save the three lowest Locks near Shannon Bridge.

The main Drain, from the Shannon, commences a little to the northward of Shannon Bridge, and is laid out along the verge of the lands of Cloniffeen, ascending two Locks, to the off branch to Clurbane, where there is a marble quarry; another Lock then takes it up to the road from Shannon Bridge to Seven Churches, crossing it at the gravel hill of Knockacurragh: the Drain is continued through Garrymore and Cloniff Bog, to the lands of Clondelaragh, and across a neck of these lands to the Blackwater Bogs; afterwards passes near the south side of Leitra Island and Derrynagun, to near Loughfanla River, where a main Drain runs to the Bogs eaſtward, and another northward towards Athlone; a number of smaller Drains branch out at proper intervals, and intersect the Bog.

That part of the Bog northward of Leitra Island is too high to admit of any collateral Drains being made to it on this level, and there are not any ſtreams which would afford a conſtant supply of water for Locks to a higher level; but as it is soft wet Bog, it perhaps would keep the Drains full the greatest part of the year, if no water is drawn from them; therefore they are not joined to the main Drain, but, if necessary, a small inclined plane may be made between the levels at Cloniff.

The main Drain to Athlone continues on the level before mentioned (three Locks above the Shannon) to the gravel hills at Moghramore and Tullybeg, having collateral Drains branching out in every direction; the road from Seven Churches to Balnahown runs along a ridge of hills, and crosses the proposed Drain at Moghramore.

At Tullybeg there is an old artificial Cut through the hill, that has been made time immemorial, and juſt answers for the main Drain to the next Bog, called the Boggawn of Monfan, which is very narrow; the main Drain is carried nearly through the middle of this, and very few collateral Drains will be wanted.

Between the hills of Ballyduff and Clonaskra there is an opening or low place, through which the main Drain is taken to Bloomhill Bogs, and it is then continued over these to Newtown River, with side Cuts or Drains at proper intervals; some parts of the Bog near the Shannon are too low for the collateral Drains to be made on the same level as the main line; a separate drainage is therefore set out in eight feet lower level, and may at any time be joined by an inclined plane or a single Lock on the lands of Bloomhill, to be supplied with water from the Athlone line.

An embankment of 23 feet muſt be made at Newtown River, to Clonbunnagh Bog; there is a quick descent from each Bog into the valley, so that scarcely any of the embankment will be upon them, the base or foundation in the valley will reſt upon ſtrong gravel and clay.

The Drains in Clonbunnagh Bog being laid out on the same plan as the others, the main line is carried from thence in the lands of Clonbunnagh, with about six feet sinking, to Bunnahindly Bog, across which it is taken in a ſtrait direction towards Athlone, and terminates at the verge of the Bog, about half a mile south of the town, and may be brought close to it whenever it is deemed expedient, as there are no difficulties in the way; the collateral Cuts are made to answer the general level of this Bog, and the River Shannon is nearly adjoining on the weſtern side.

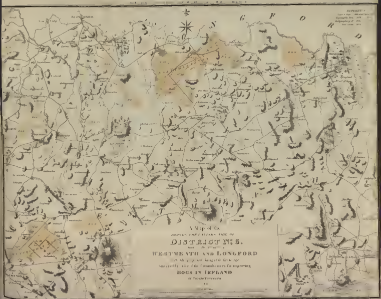
The navigable Drain from the Grand Canal to Athlone, commences eaſtward of Belmont Lock, crosses the river Brusna with an aqueduct and embankment of 14 feet in height, enters the lands of Killagally, in which runs the road from Shannon Bridge to Firbane, then having sinking of 26 feet depth of gravel (all which will be brought into the Bog) in Ballycommon and Faddenbeg, it afterwards enters Blackwater Bog, proceeding along this to Derrylahan, from thence to Clonbonniff and part of Clonline, and over the Blackwater River, with a short embankment 16 feet high (the valley clay and gravel) to Derrykenniff, where it communicates with the main Drain from Lamonahan and the other Bogs, and this Drain is continued to Loughfanla River, which it crosses with a very small embankment, and immediately joins the main Drain before described, to Athlone.

A number of collateral Cuts are laid out, to such parts of the Bogs as suit the level of the main Drain; and for a part of Derrylahan Bog, Drains on a lower level of eight feet answers, and there is a favourable situation either for a Lock or inclined plane on Derrylahan.

At Derrykenniff there are two seven-feet Locks on the main Drain towards Lamonahan, to rise up to the elevation of the higheſt part of the Blackwater Bogs; the main Drain, with the necessary off branches, is marked out near Clonfanla, to the lands of Clongowny, where it crosses the road from Cloghan to Athlone. I have continued this level through Clongowny, and crossing a small valley at Derrywee, into Lackagh Bogs to Corr Hill, from whence an off branch is taken along the foot of Endrim Hill, to the Bog which lies between Clonline and Clongowny, on the south side the Blackwater; and several of the smaller Drains intersect it on the upper level of Derrykenniff.

On the main line, after quitting Lackagh Bog, there is one nine-feet Lock at Corr Hill, and then a collateral Cut to Doon, where it crosses (in the upland) a road from Seven Churches; the Bog from thence to Balnahown and Cloneyderrig is intersected with the smaller Drains; at Curraluſka Hill the collateral Cut recrosses the laſt-mentioned road, to accommodate the high Bog between Carraluska and Clongowny, where several Drains are marked out.

I firſt



A Map of the
BOGS ON THE EASTERN SIDE OF
DISTRICT N° 8.
lying in the Counties of
WESTMEATH AND LONGFORD
with the proposed Lines of Drainage
Surveyed by order of the Commissioners for improving
BOGS IN IRELAND
BY THOMAS TOWNSHEND

I firſt intended to bring the main line by this route, but found it too circuitous, and that it would not be so well adapted to the level of Endrim and Clonline Bog.

At Corr Hill there are two seven-feet Locks, and one eight-feet Lock, which brings the main line to Lamonahan Bog; the road from Ferbane to Athlone crosses it here.

The Collateral Cut to Endrim Bog is taken out at this point, and is carried in those places moſt favourable to the level of the main line; but as the greateſt part of the Bog is much higher, I have marked out the Drains on a level 21 feet above; although this Bog is not so extensive as to repay for the expense of Locks, the Drains will answer for bringing in limeſtone gravel from the surrounding lands.

Moyclare Bog being considerably lower than Endrim, a diſtinct Drainage is set out upon it, the level of which is 10 feet below the main line entering Lamonahan Bog.

Proceeding with the main Drain from Corr Hill, I wiſhed to bring it through the middle of Lamonahan Bog; but as there is a valley from Kilnagoolny to Lamonahan, it could not be done without deep sinking for a great extent opposite Dirrika, or high embankment in the valley on soft Bog; therefore I was obliged to lay it out to Shraduff, and along those lands and Kilnagoolny, entering the Bog again at Thumbeagh; side Cuts are made to that part opposite Dirrika, and at Thumbeagh a branch of the main Drain departs to Derringlock, where a Lock is placed descending to the level of the Drains in the interior: this main branch is continued only to the road leading from Ferbane to Ballycumber, where another Lock or inclined plane ſhould be made to descend to the loweſt parts of this Bog, near the River Brusna, and also to connect the two loweſt wings by a smaller Cut through the lands of Lamonahan; these Locks will be supplied with water from the main line.

Returning to the main line at Thumbeagh, it crosses a road from Corr to Bellair, at the foot of a hill, where a Lock of eight feet rise is placed, to ascend to the higheſt level of this Bog, and the lands of Coolderiha.

Two eight-feet Locks are intended to be placed in Coolderiha, to ascend to the elevation of Bellair and Mountprospect Bog; the main Drain passes through Ballinakill, and all the collateral Cuts are on the same level with the main line, only a small part near Loughill towards Balnahown, which will be provided with separate Drains 17 feet below the others; the collateral Drains are not carried into those parts which Mr. Holmes is improving and planting.

The higheſt part of Willbrook Bogs corresponds with the level of Bellair and Mountprospect, and the main Drain can be continued on the same level, the diſtance five miles between the two, along the lands of Hall Bladdery (crossing the road from Ferbane to Moat) Caſtledaly (crossing the road from Ferbane to Moat) Tubberit Glynn (where it crosses the road from Dublin to Athlone) Aughnavoneen and Tullymaganley.

This extension of the main Drain will not only connect Willbrook and Creggan Bog with the others, but will also serve to conduct the supply of water from various ſtreams, for all the Locks and Drains before described.

Willbrook and Creggan Bog varies so much in the level of the surface, as to require two ten-feet Locks on the collateral Cuts, the expense of which would fall heavy on so small a portion of Bog, although there will be sufficiency of water; perhaps an inclined plane would be more preferable.

The main Drain intended to connect all the Bogs from the Shannon, Athlone, Ferbane, Ballycumber, Bellair, Grand Canal, &c. &c. terminate on Willbrook Bog.

The next Bog is at Moyvoughly, north of Moat a Grenogue, the diſtance three miles and a quarter, and would require six nine-feet Locks to connect it with Willbrook Bog, the expense of which will preclude any navigable communication, except the Bog had been more extensive; therefore the Drains upon it are calculated for improving that Bog only, without reference to any other, and yet the inequality of surface makes it necessary to have a ten-feet Lock or an inclined plane on a small Island or Derry in the centre.

Ballymaglavey Bog is too far diſtant from any of the Bogs in this diſtrict to form a navigable communication between them; and there are also other difficulties to encounter, high grounds intervening, &c. but as the line of the Royal Canal runs across it, the proposed Drains may communicate therewith, whenever that Canal ſhall be executed; the fall of this Bog is so great as to require five eight-feet Locks to give favourable levels for the collateral Cuts intersecting it, and if the Drains were to be joined to the River Inny, two Locks more muſt be added.

I have in all cases endeavoured to select situations for the Locks, so as to have them on firm foundations; but where small inclined planes will answer, they may be made on any part of the Bogs: it is proper to remark, that the inclined planes are intended to save expense and an unnecessary waſte of water, and are meant for the collateral Cuts only, in situations which do not admit of their being upon the level of the main Drain; the small boats when empty, and also the waggons, can easily be moved up or down the inclined planes, to the different levels where boats can be serviceable in the operations of reclaiming and improving the Bogs.

The main Drain being intended as a Canal for the general advantage of the country as well as for the particular use of the Bogs, the Locks upon it cannot so readily be dispensed with; however, the entire expense in those cases ſhould not be considered as belonging exclusively to the Bog improvements.

Where the navigable Drains, which are intended to connect the Bogs, unavoidably pass through tillage and paſture grounds, the excavation will generally be in limeſtone, gravel, or clay; I therefore propose to lay out those parts to the depth of six feet sinking and upwards, so that the entire quantity which may be dug out, can be taken by boats during the progress of the work, to assist in improving the Bogs, inſtead of wheeling it out on each side, or making banks, except where embankments may be necessary to cross any of the small rivers: this mode of bringing gravel into the Bogs will not be much more expensive than getting it from any of the surrounding hills, and thus by degrees the communication between one Bog and another will be effected without adding to the expense of cultivation.

The marl and gravel underneath the Bog or Peat would not in general pay for the expense of off-baring and clearing it of water in the deep Bog, and it would be too inconvenient and expensive to carry it from the ſhallow parts in sufficient quantities for the cultivation of extensive tracts, and the small Islands or Derries ſhould be preserved entire for erecting houses upon them; recourse muſt therefore be had to the adjoining lands, where a greater variety, if not better manures, are to be met with.

The navigable Drainage will for ever afford a cheap and permanent conveyance to and from every portion of Bog, both for the present and future improvements; will also supply the entire surface with water for agricultural purposes; will drain the Bog effectually, and enable the farmer to carry, at a cheap rate, the produce of this new cultivation, on the Canals, into remote diſtricts of the country, that stand in need of supplies of corn, &c. &c. &c.

The syſtem of Drainage which I humbly submit to the consideration of the Commissioners, will answer all descriptions of Bog, whether deep or ſhallow, the depth of the Bog or Peat is of no consequence in determining where they are to be made, as they are intended to suit the level of the surface; nor do I conceive it at all necessary to sink the Drains to the full depth of the Bog, with an intention of drawing or tapping the water from it, because (excepting a few feet near the surface) the great mass of Bog or Peat is a subſtance which is impervious to water; in some cases, where it is all hard black Peat, I have seen the turf-cutters sink from the surface to the gravel, without being in the leaſt incommoded with water; and some of the pits which were not entirely sunk to the gravel, have remained perfectly dry for many weeks or months, if the rain water did not fall into them.

There are layers or ſtrata of this description, more or less, in every Bog; and I am decidedly of opinion that the springs under the Bog do not penetrate upwards through this subſtance, except where there are clefts or openings, but that the wetness of the Bogs is caused by the rain water &c. falling on the surface, and lodging in the small cracks and indentures; and in the spongy texture of the surface, moss and other vegetation, which varies in depth according to its nature and quality, these retain the rain water until it is exhaled by the atmosphere, or slowly drained by the natural descent of the surface.

The deciduous parts of the annual vegetation, decayed fibres, &c. &c. adds to the mass of peat, and perhaps in its decomposition affords nutriment (together with the rain water) to the next succeeding growth.

That description of moss which retains moſt rain water, has the quickeſt growth; hence we often find the softeſt parts of the Bogs in the moſt elevated places, and in many inſtances even higher than the surrounding lands; and, on the contrary, hard firm Bog on the loweſt levels; which I think is a convincing proof that springs or rivers are not a principal cause of the fluidity of Bogs, but rather that they do not ascend into it at all.

As a further corroboration, it frequently happens that considerable tracts of Bog have their base much above the level of the natural outlets; so that it is probable any springs which may be underneath the peat, would percolate through the sand or other porous ſtrata, or the interſtices of rock, until it vented into the adjacent rivers.

In other cases several springs may unite, and form subterraneous small ſtreams between the peat and the subſtratum on which it reſts, and in this manner they are conveyed along to a natural issue.

The continual action of air and water along these small passages, may by degrees have undermined a few places where the peat is leaſt fibrous or pulpy, and increasing gradually until the cavity is so large that the superincumbent weight gives way to the surface, forms the gullies or swallow holes that are to be met with in various parts of the Bogs.

After rains there are small ſtreams formed on the Bogs, which, in pursuing their course, sometimes sink and reappear many perches diſtant. This is a further inſtance of the ſtaunchness of peat; because these subterraneous rivers do not always pass through to the gravel, as the water would then get a vent, and totally disappear if the subſtratum was of an open or porous nature; they are a kind of small tunnels perforated to a certain extent, but wholly within the mass or body of peat; the water being thus conveyed as it were through a cylinder of Bog, discharges the same quantity at the lower end, that entered in at the upper; whereas if the great body of Bog partook of the nature of ſponge, the ſtream could not be traced to where it reappears, as it would be diffuſed through and loſt in the maſs of peat.

It may be inferred from theſe premiſes, that ſmall Drains, with levelling and trimming the ſurface, will completely anſwer all the purpoſes of drainage; and the immenſe ſaving of expenſe, time and riſk in execution, together with the advantages to be gained by preventing obſtruction and inconvenience to the general intercourſe and communication, will make them preferable, beyond compariſon, to deep ones; but, as it is neceſſary to combine the mode of cultivation with the plan of drainage, to accompliſh an effectual improvement of Bog, it is highly expedient that they ſhould all be navigable, to anſwer every purpoſe.

Annexed is an Eſtimate of all the Drains within the Bogs, excluſive of the connecting Drains in the grounds between them, as the gravel from thoſe parts is intended to be brought in to aſſiſt in cultivation, as before mentioned.

The total amount of the expenſe of a navigable Drainage, £.63,435. 7. 1½. the quantity of Bog, excluſive of Derries or Iſlands, 21,075 acres 1 rood 8 perches, Iriſh; which makes the average expenſe £.3. 0. 2. per acre.

The expenſe of Locks Bridges and Culverts on the main Drains, with inclined planes on the collateral Cuts, and forming a junction both with the Grand Canal and the River Shannon, amounts to £.18,530. which will make an average of 17*s.* 7*d.* per acre, on 21,087 acres 1 rood 34 perches.

If Locks were to be built on the collateral Cuts inſtead of inclined planes, they would add to the above ſum £.8,000. of which £.3,300. is on Ballymaglavey Bog, making an average of 7*s.* 7*d.* per acre.

On the mode of culture which may be beſt adopted for reclaiming and improving the Bogs, there are variety of opinions; it is a ſubject on which I with diffidence offer any remarks; the cheapeſt mode, and that which will quickeſt turn to profit, I ſhould ſuppoſe will have the preference.

The great objects apparently neceſſary are to deſtroy the vegetative power of the moſs, heath, &c. and to procure proper manures for creating vegetation of a more beneficial and uſeful quality, on the eaſieſt terms.

Draining will check the progreſs, but not entirely deſtroy the heath, moſs, &c. without its being alſo dug to a certain depth; and when once the ſurface is turned over, it is uſual to burn the top ſod, to produce a manure; a repetition of this mode will in time have the deſired effect in annihilating the moſs, &c. but the crops will be light compared with good arable land, and if the proceſs is diſcontinued and no further aid procured, it will then remain in a ſtate ſimilar to cutaway Bog.

Where the cultivation on a ſoft red Bog is partially done, practiſed only for a few years, and finally neglected, previous to the fibres of the growing moſs being totally decayed, it will revive and force its way through the weak and tender graſs, ſo that in a few years more the Bog will reſume nearly its original ſtate and appearance, particularly if the ſmall Drains are not kept open. I have obſerved this to be the caſe with ſeveral ſmall patches that have been taken in and let out again.

Another way of deſtroying the moſs, &c. is to lay on a covering of manuring, or limeſtone gravel, after the ſurface is levelled and trimmed ſufficient to keep the moſs under until the fibres are decayed; this mode will alſo materially aſſiſt in keeping the Bog dry, becauſe the weight will in a ſlight meaſure compreſs the ſpongy ſurface, ſo that it will not ſoak the water with the ſame facility; add to which the gravel will cement, and prevent much of the rain water from penetrating, by warding it off and diſcharging it into the Drains.

The gravel will be a laſting aid to the new vegetation; will alſo give proper ſtamina to the Bog for the growth of timber of every deſcription, (in fact, it appears that timber cannot be matured without it on Bogs) every repetition, if ſpread equally on the ſurface, will add to the firmneſs of the Bogs and luxuriance of the crops, and the Farmer will be repaid, for his expenſe and trouble, from the renovation of the ſoil.

Some perſons imagine that gravel will ſink through the Bog; however, the idea does not ſeem to be altogether well founded, for we ſee roads over Bogs that require little more repairs, if kept dry, than the ordinary ſtint of any other roads; whereas if the gravel ſunk in the manner ſuppoſed, theſe roads could not be made paſſable, or would require a continual acceſſion of gravel to keep them in order; this does not ſeem neceſſary even where there is an inceſſant rolling of carriages, cars, &c. in very old roads, that have been a long time deſerted, the gravel ſtill remains on the ſurface, and the moſs, &c. has given way to a beautiful verdure, although the gravel, probably, was not nicely ſelected.

The whole of this Diſtrict abounds in limeſtone gravel, very fit for manuring and fertilizing the Bogs; and the navigable Drains herein propoſed, will afford the eaſieſt conveyance poſſible. They are in many inſtances directed to the foot of a ſteep gravel hill of from 50 to 80 feet in height, and of an inferior quality of ground, in order that a ſufficiency may be procured with the leaſt injury to the adjoining lands that the nature of the business will admit of; one acre of a gravel hill 50 feet in height, will cover 600 acres of Bog one inch thick, and so in proportion.

Taking the gravel hills at an average of only 30 feet in height, which is a low calculation, the one acre will cover 360 acres of Bog, one inch thick; and supposing the broken ground to be afterwards totally useless, the purchase of an acre, I think could not exceed £. 36. this will amount to two ſhillings per acre, on the surface of the Bog, for damages to the grounds from whence the limeſtone gravel is to be procured.

The plan which I beg leave to recommend for bringing the gravel into the Bogs is, to have flat-bottomed boats with a platform even with the gunnel, and a double railway upon it, calculated for two rows of waggons or carriages to be conſtructed for the purpose, and over this, if necssary, another platform may be erected with a single railway upon it, leaving sufficient headway for the lower tier.

A ſhort caſt-iron railway to be laid on the ground, between the gravel hill and the boat, for the waggons to run on, and when as many are placed upon the boat as the railway on the platform will contain, two men will take the boat along the Drains into the Bog, and there to have another railway not exceeding 40 perches, (280 yards) to run the waggons from the boat to any part of the surface, then to fill them and return with them emptied, and soon as they are all replaced on the boat, to return with it to the gravel hill and repeat their operations.

I am also of opinion, that caſt-iron railways and waggons could be very advantageously used along the exterior edges of the Bog, where gravel hills are convenient, and also in the small detached Bogs and places that cannot be accommodated with a navigable Drainage and boats.

The facility with which gravel can at any time be brought in by boats, renders it unnecessary to lay on more in the firſt inſtance than is really required to produce one crop; then to go on progressively, increasing the quantity with each succeeding crop, until the Bogs are gravelled completely to any thickness; and they will become profitable from the firſt commencement of the business, inſtead of having to wait for the full quota of gravel before the crops are put down, and will not require so large a sum to be laid out on the firſt onset.

I have calculated for one inch only of gravel, as being sufficient to produce a succession of crops, but not for a permanency; the quantity per acre will be nearly 218 cubic yards, and at the rate of sixpence per yard, for excavating and removing by boats, will amount to £. 5. 9. 0. per acre.

The value of the Bog, when drained and gravelled, providing it be properly done, will be nearly equal to the adjoining lands, and these in general may be averaged at upwards of two guineas per acre per annum; the Bogs therefore, when improved in the manner before-mentioned, with the advantages also of a Canal conveyance to every part, I think may fairly be eſtimated worth thirty ſhillings per acre, yearly value, at the leaſt.

The aggregate expense of draining and improving all the Bogs in this diſtrict, including navigable Drains, and opening a communication with the neighbouring country, will be as follows; viz.

	£.	s.	d.	
The navigable Drains - - - - - - -	3	0	2	
Masonry on D° with inclined planes on the collateral Cuts	0	17	7	
Gravelling the Bogs one inch deep - - - - -	5	9	0	
Damages to lands - - - - - - -	0	2	0	
	£. 9	8	9	per Iriſh acre.
Which is equal to - - - - - - -	£. 5	16	5½	per Engliſh acre.

When once the Drains are made in the manner before-mentioned, any future improvements on extensive tracts of Bog, can be done much cheaper than by any other plan; and those persons who undertake to reclaim and cultivate them, may very well afford to pay, by an acreable rent, for the convenience of navigation, from which they will receive so much benefit.

The country will also derive great advantages from this extenſion of Canals, and ought to contribute towards it by a small toll upon such articles as may be conveyed upon it, that are not immediately connected with the cultivation of the Bogs.

Without a general union of intereſts, either by consent of parties or under the authority of an Act of Parliament, with a Board to conduct the execution of it, the scheme could not be carried into effect by the Proprietors of Eſtates adjoining, with any prospect of success or remuneration, as in many inſtances the property is undivided; some might be willing, and others unwilling or unable, to engage in such speculations; the grounds which might have great extent of Bogs attached to them, could not furniſh the proper manures; others again who have little or even no Bogs, may have abundance of manures; those who might be disposed to improve, could not make the proper Drains, roads or other conveniencies, unless the next proprietor would also extend them through another eſtate.

In some cases the peculiar tenure of the eſtates may prevent the present possessors from laying out money on such improvements, or even to give encouragement to others by offering proper assistance and leases for a long term of years, and numerous other obstacles which cannot be foreseen might occur, so as to render a partial attempt at improvement unsuccessful; and until there have been a number of beneficial experiments made, very few individuals will run the riſk of encountering the difficulty, although there can be no doubt of the result answering the moſt sanguine expectations.

Gentlemen,
I have the honour to be
Your moſt obedient and humble Servant,
THOMAS TOWNSEND.

Balna Carig,
26 February 1811.

Contents of the Bogs, in Irish and English Acres.

DENOMINATIONS.	N° on the Map.	QUALITIES.	Quantities in Irish Plantation Measure.	Quantities in English Statute Measure.	Total Quantities Irish Plantation Measure.	Total Quantities English Statute Measure.
			A. R. P.	A. R. P.	A. R. P.	A. R. P.
Shannon Bridge and Knockna Curra	1	Bed Bog	126 3 33	205 2 24	138 0 3	223 2 11
		Improved D°	9 1 10	15 0 13		
		Cut away	1 3 0	2 3 14		
Cloniff and Clurhane	2	Red Bog	173 2 35	281 1 23	173 2 35	281 1 23
C'ondelara, Garrymore, Cloniffen and Cloniff		Bog	331 1 12	536 2 30	344 0 12	557 1 15
		Improved	6 0 20	9 3 28		
		Cut away	6 2 20	10 2 37		
Annaghmore, Clanover, Clondelara, Cloniff, Clurhane, Creevagh, Seven Churches, Moghramore, Tullabeg and Cloufanla	4	Bog	2,318 1 0	3,755 0 29	2,334 2 0	3,781 2 0
		Lough Nug	2 3 0	4 1 33		
		Improved Bog	10 0 0	16 0 32		
		Moory Paſture along Loughfauler River	3 2 0	5 2 26		
		Leetie Iſland	53 1 0	86 1 1		
		Lough Fauler	117 1 0	189 3 28		
Annaghmore, Clonfarla, Clongowney and Clonline	5	Bog	1,676 1 14	2,715 1 22	1,727 2 27	2,798 2 6
		Lucas's Imp^d Bog	1 2 10	2 2 5		
		Imp^d Derry Kinniff	2 1 15	3 3 7		
		Moory Paſture along Blackwater	47 1 28	76 3 12		
		Derry Kinniff	11 0 25	18 0 11		
Lisdaly	6	Bog	93 1 21	151 1 2	97 3 11	158 1 32
		Cut away Bog	3 1 10	5 1 18		
		Moory Paſture	1 0 20	1 3 12		
Kilcummin	7	Bog	207 2 14	336 1 2	228 2 30	370 1 30
		Derrylahem	1 0 20	1 3 12		
		D° Moory Paſture	3 2 20	5 3 19		
		Lucas's Imp^d Bog	8 1 16	13 2 4		
		Moory Paſture along Blackwater	8 0 0	12 3 33		
Fadden and Clonbonniff	8	Bog	433 3 22	702 3 28	462 1 0	748 3 5
		Cut away	19 0 0	30 3 4		
		Improved	1 1 0	2 0 4		
		Moory Paſture	8 0 8	13 0 7		
Clonline	9	Bog	174 0 39	282 0 39	197 3 28	320 2 17
		Improved D°	1 2 21	2 2 23		
		Moory Paſture	22 0 8	35 2 35		
Glebe and Clonline	10	Bog	293 2 5	475 1 36	300 2 5	486 3 10
		Improved	7 0 0	11 1 14		
Endrum	11	Bog	20 0 15	32 2 8	25 2 15	41 1 33
		Paſturable	5 2 0	8 3 25		
Endrum	12	Bog	22 1 0	36 0 7	27 0 32	44 0 10
		Cut away	2 0 32	3 2 10		
		Improved	2 3 0	4 1 33		
Endrum	13	Bog	3 0 0	4 3 18	6 1 20	10 1 12
		Cut away	2 0 0	3 0 38		
		Improved	1 1 20	2 0 36		
Endrum	14	Cut away Bog	8 1 0	13 1 18	8 1 0	13 1 18
Corr	15	Bog	85 3 27	139 0 28	92 3 27	150 2 2
		Cut away	7 0 0	11 1 14		

Contents of the Bogs in Irish and English Acres—*continued.*

DENOMINATIONS.	N° on the Map.	QUALITIES.	Quantities in Irish Plantation Measure.	Quantities in English Statute Measure.	Total Quantities Irish Plantation Measure.	Total Quantities English Statute Measure.
			A. R. P.	A. R. P.	A. R. P.	A. R. P.
Corr	16	Bog	31 0 0	50 0 34		
		Cut away, improved	1 0 0	1 2 19		
		Moory Pasture	13 1 0	21 1 34	45 1 0	73 1 7
Lacagh	17	Bog	237 0 21	384 0 18		
		Cut away	2 1 16	3 3 9		
		Improved	0 3 30	1 2 3		
		Moory Pasture	16 1 30	26 2 20	256 3 17	416 0 10
Lacagh and Doon	18	Bog	83 1 25	135 0 17		
		Moory Pasture	8 1 30	13 2 7	91 3 15	148 3 4
Doon Brackagh and Cloneyderg	19	Bog	98 0 30	159 0 7		
		Cut away	16 0 0	25 3 27	114 0 30	184 3 34
Doon and Cloneyderig	20	Bog	98 1 0	159 0 24	98 1 0	159 0 24
Cloneyderig	21	Bog	64 2 4	104 2 4		
		Improved	1 0 0	1 2 19	65 2 4	106 0 23
Cloneyderig and Clongowney	22	Bog	450 2 0	729 2 38		
		Cut away	1 0 0	1 2 19		
		Improved	1 1 0	2 0 4		
		Moory Pasture	1 0 0	1 2 19	453 3 0	735 0 0
Boggan of Monfan	23	Bog	440 2 2	713 2 9		
		Cut away	36 3 15	59 2 29		
		Derry or Island	0 3 15	1 1 19	478 0 32	774 2 17
Boggan of Monfan	24	Bog	36 3 10	59 2 21		
		Cut away	14 2 15	23 2 22	51 1 25	83 1 3
Clonaskra	25	Bog	391 0 4	633 1 23	391 0 4	633 1 23
Ballyduff	26	Bog	190 1 12	308 1 7		
		Cut away	3 0 10	4 3 34	193 1 22	313 1 1
Cloneyderig and Bloomhill	27	Bog	246 3 30	400 0 0		
		Island, pasturable	7 2 6	12 0 33	254 1 36	412 0 33
Curraghbacy and Bloomhill	28	Bog	421 1 32	682 2 29		
		Improved	18 0 0	29 0 25		
		Cut away	2 2 22	4 1 3	442 0 14	716 0 17
Bloomhill Island	- -	Arable, Pasture, and Meadow	235 3 24	— — —		
Newtown Reehaune and Balnahown	29	Bog	509 2 20	825 2 1		
		Cut away	2 2 8	4 0 21		
		Improved	18 2 4	30 0 1	530 2 32	859 2 23
Clonbunnagh, Curraleena, Cosh, and Callownagowney	30	Bog	444 1 2	719 2 21		
		Improved	1 2 0	2 1 29	445 3 2	722 0 10
Carrick O'Brien and Bunahindley	31	Bog	666 0 14	1,078 3 32		
		Improved	1 1 37	2 1 24	667 2 11	1,081 1 16
Ballylammon and Mayclare	32	Bog	225 2 8	365 1 17		
		Cut away	5 2 0	8 3 25		
		Improved	39 3 0	64 1 22	270 3 8	438 2 14
Clonline Glebe	33	Bog	54 2 10	88 1 21		
		Improved	6 0 20	9 3 27		
		Cut away	6 1 0	10 0 20	66 3 30	108 1 28
Mayclare, Curraghdawn, Ferbane, Ballylin, Endrum, and Creggan	34	Bog	103 1 32	167 2 12		
		Improved	19 2 15	31 2 38		
		Cut away	19 3 0	31 3 39	142 3 7	231 1 9
Ferbane, Ballylin, and Endrum	35	Bog	336 0 23	544 2 0		
		Improved	1 3 35	3 0 30		
		Cut away	13 2 30	22 0 27	351 3 8	569 3 17

Contents of the Bogs in Irish and English Acres—*continued.*

DENOMINATIONS.	N° on the Map.	QUALITIES.	Quantities in Irish Plantation Measure.	Quantities in English Statute Measure.	Total Quantities Irish Plantation Measure.	Total Quantities English Statute Measure.
			A. R. P.	A. R. P.	A. R. P.	A. R. P.
Lamonahan, Clillugh, and Curraghalassa	36	Bog	1,398 0 0	2,264 2 5	1,431 3 0	2,319 0 32
		Improved	14 3 0	23 3 23		
		Cut away	16 2 0	26 2 36		
		Moory Pasture	2 2 0	4 0 8		
		Ballydaly Island	3 0 10	4 3 34		
		Derrenneal Island	0 1 0	0 1 24		
Lamonahan and Caſtlearmſtrong	37	Bog	1,434 1 30	2,323 2 8	1,487 3 30	2,410 0 34
		Improved	29 1 20	47 2 13		
		Cut away	24 0 20	39 0 13		
		Cockgrove Island	6 3 0	10 3 30		
		Derryvane Island	14 0 0	22 2 28		
		D° South	0 0 20	0 0 32		
		DerrinaglochIsld	17 0 10	27 2 22		
		Isld near Coolderiha	0 1 20	0 2 17		
Loughill and Caſtledaly	38	Bog	122 1 0	198 0 4	138 1 30	224 0 39
		Improved	2 2 0	4 0 8		
		Cut away	12 3 10	20 3 0		
		Moory Pasture	0 3 20	1 1 27		
Caſtletown and Caſtledaly	39	Bog	131 1 0	212 2 16	156 0 0	252 2 31
		Improved	5 0 0	8 0 16		
		Cut away	19 3 0	31 3 39		
Corrigcollan, Cappaluska, Coolderika, and Bellair	40	Bog	460 0 0	745 0 20	470 0 0	761 1 12
		Improved	2 2 20	4 1 0		
		Cut away	7 1 20	11 3 32		
Hall Sheehem, Mosuen, Ballmakill, and Ballinamuddagh	41	Bog	818 2 0	1,325 3 13	848 1 0	1.374 0 4
		Improved	1 2 0	2 1 29		
		Cut away	28 1 0	45 3 2		
Bellair and Moorock	42	Bog	599 1 35	971 0 6	607 1 35	984 0 0
		Improved	1 2 0	2 1 29		
		Cut away	6 2 0	10 2 5		
Finnamuck	43	Bog	62 0 16	100 2 15	68 3 16	111 2 4
		Improved	2 1 8	3 2 36		
		Cut away	4 1 32	7 0 33		
Moorock and Proſpect	44	Bog	145 2 25	235 3 30	176 0 5	285 0 22
		Improved	0 2 30	1 0 18		
		Cut away	29 2 30	48 0 14		
Creggoin, Crosswood, and Glynn	45	Bog	310 3 36	503 2 37	400 3 6	649 0 34
		Cut away	74 0 15	120 0 3		
		Improved	7 2 33	12 1 37		
		Moory Pasture	8 0 2	12 3 37		
Tullywood and Tullymagawly	46	Bog	99 3 2	161 2 16	123 0 16	199 1 25
		Cut away	16 1 11	26 1 30		
		Improved	2 0 0	3 0 38		
		Moory Pasture	5 0 3	8 0 21		
Bealyn, Willbrook, Highwarren, Belville, Coernpark, and Cappabrack	47	Bog	564 0 20	913 3 6	658 3 37	1,067 1 31
		Cut away	81 2 35	132 1 20		
		Improved	1 3 22	3 0 9		
		Planted	11 1 0	18 0 36		
Mayvoughly, Shurock, and Clouthread	48	Bog	158 2 26	257 0 1	263 0 36	426 1 21
		Cut away	61 0 26	99 0 12		
		Improved	33 2 10	54 1 18		
		Moory Pasture	9 3 14	15 3 30		

Contents of the Bogs in Irish and English Acres—*continued.*

DENOMINATIONS.	N° on the Map.	QUALITIES.	Quantities in Irish Plantation Measure.	Quantities in English Statute Measure.	Total Quantities Irish Plantation Measure.	Total Quantities English Statute Measure.
			A. R. P.	A. R. P.	A. R. P.	A. R. P.
Gallstown, Seintown, Ballindeny, and Kilnahinch	49	Bog - - -	658 1 33	1,066 2 15		
		Cut away - -	61 3 34	100 1 19		
		Improved - -	10 2 35	17 1 18	731 0 22	1,184 1 12
Mayvore, Williamstown, and Ballymagleavy -	50	Bog - - -	819 0 15	1,326 3 8		
		Cut away - -	139 3 17	226 2 7		
		Improved - -	10 0 28	16 1 37		
		Moory Paſture -	30 2 0	49 1 25	999 2 20	1,619 0 37
Rathkellet, Caſtlegadry, Coulanstown, and Ballinacarrow - -	51	Bog - - -	40 2 5	65 2 25		
		Cut away - -	69 2 10	112 2 29		
		Moory Paſture -	8 1 25	13 2 19	118 2 0	191 3 33
Rath and Abbyſhrule -	52	Bog - - -	628 1 10	1,017 3 2		
		Cut away - -	182 3 5	296 0 12		
		Improved - -	1 2 11	2 2 7		
		Paſturable - -	4 1 27	7 0 25	817 0 13	1,323 2 6
					21,075 1 8	34,138 2 2

SUMMARY of the preceding STATEMENT.

	IRISH.	ENGLISH.
	A. R. P.	A. R. P.
Bog - - - - - - - - - - - -	19,661 3 19	31,848 3 18
Cut away Bog - - - - - - - - - -	1,023 0 23	1,657 1 12
Improved Bog - - - - - - - - - -	290 0 10	469 3 15
Paſturable Bog - - - - - - - - - -	207 3 35	336 3 21
Islands or Derries in Bog - - - - - - - -	115 2 6	187 0 23
	21,298 2 13	34,500 0 29

ESTIMATE OF THE PROPOSED DRAINS.

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.	Price per Perch of Seven Yards lineal.	AMOUNT.	REMARKS.
		Perches.	Ft. Inc⁸.	£. s. d.	£. s. d.	
1 - -	1	77	7 0	1 5 —	96 5 —	Main Drain, commencing at River Shannon.
1 & 2 -	2	400	8 0	1 4 7½	492 10 —	Collateral Drain from near Shannon Bridge to Clurhan.
1 & 3 -	3	88	- -	- - -	- - -	Main Drain in the gravel at Knocknacurragh.
3 - -	4	72	7 0	1 5 —	90 — —	Main Drain in Bog near Knocknacurragh.
- -	5	102	7 0	— 19 10	101 3 —	Collateral Drain.
- -	6	100	10 0	2 2 9	213 15 —	D°
- -	7	75	12 0	4 7 1	326 11 3	Main Drain.
- -	8	108	12 0	3 12 1½	389 9 6	Collateral Drain to Cloniff Gravel Hills.
- -	9	100	9 0	1 12 11	164 11 8	- D° - Garrymore.
- -	10	113	12 0	4 7 1	492 — 5	Main Drain to Clondelaragh.
3 & 4 -	11	143	- -	- - -	- - -	- D° in the lands of Clondelaragh.
4 - -	12	142	11 0	3 16 1	540 3 10	- D° in Leitra Bogs.
- -	13	100	6 0	— 14 —	70 — —	Collateral Drain near Annaghmore.
- -	14	80	7 0	— 19 10	79 6 8	- D°
- -	15	120	9 0	1 12 11	197 10 —	- D° - near Clanover.

Estimate of the Proposed Drains—*continued.*

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.
		Perches.	Feet.	Inc.	£.	s.	d.	£.	s.	d.	
4 - -	16	71	7	0	—	19	10	70	8	2	Collateral Drain near Clanover.
- -	17	90	10	0	2	2	9	192	7	6	- D° - - Cloudelaragh.
- -	18	71	8	0	1	4	7½	87	8	4½	- D°
- -	19	110	12	0	3	12	1½	396	13	9	- D°
-	20	72	7	0	—	19	10	71	8	0	- D°
-	21	79	8	0	1	13	8½	133	2	11½	Main Drain, Leitra Island.
- -	22	170	7	0	—	19	10	168	11	8	Collateral Drain.
- -	23	80	8	0	1	13	8½	134	16	8	Main Drain.
- -	24	80	6	0	—	14	—	56	—	—	Collateral D°
- -	25	81	7	0	1	5	—	101	5	—	Main D°
- -	26	60	6	0	—	14	—	42	—	—	Collateral D°
- -	27	168	8	0	1	13	8½	283	3	—	Main Drain near Derrynagun.
- -	28	200	7	0	—	19	10	198	6	8	Collatoral, on higher level, Clurhane.
- -	29	62	9	0	1	12	11	102	—	10	D°
- -	30	79	8	0	1	4	7½	97	5	4½	D°
- -	31	80	8	0	1	4	7½	98	10	—	D°
- -	32	160	6	0	—	14	—	112	—	—	D° to Leitra Island.
- -	33	71	7	0	—	19	10	70	8	2	D° to Clurhane.
- -	34	80	7	0	—	19	10	79	6	8	D°
- -	35	70	7	0	—	19	10	69	8	4	D° to Leitra Island.
- -	36	40	7	0	—	19	10	39	13	4	D°
- -	37	32	6	0	—	14	—	22	8	0	D° to Clurhane.
- -	38	140	8	0	1	4	7½	172	7	6	D° near Lough Nug.
- -	39	40	8	0	1	4	7½	49	5	—	D°
- -	40	110	8	0	1	4	7½	135	8	9	D°
- -	41	80	7	0	—	19	10	79	6	8	D°
- -	42	100	6	0	—	14	—	70	—	—	D° to Derrynagun.
- -	43	80	7	0	—	19	10	79	6	8	D° to Dunaveigh higher Level ends.
- -	44	100	7	0	1	5	—	125	—	—	Main Drain near Loughfanla River.
- -	45	80	7	0	—	19	10	79	6	8	Collateral Drain.
- -	46	73	7	0	1	5	—	91	5	0	M. D.
- -	47	80	6	0	—	14	—	56	—	—	C. D. near Loughfanla.
- -	48	233	8	0	1	4	7½	286	17	7½	C. D.
- -	49	77	12	0	3	12	1½	277	13	7½	C. D. to the Lands of Creevagh.
- -	50	83	6	0	—	17	10½	73	13	—	M. D.
- -	51	73	10	0	2	2	9	166	14	6	C. D. to Creevagh Hill.
- -	52	105	12	0	3	12	1½	378	13	1½	C. D. to Seven Churches.
- -	53	81	8	0	1	4	7½	99	14	7½	C. D.
- -	54	129	12	0	3	12	1½	465	4	1½	C. D.
- -	55	116	7	0	1	5	—	145	—	—	M. D. to Moghramore Gravel Hills.
4 & 23	56	110	-	-	-	-	-	-	-	-	M. D. Gravel Tullybeg.
- -	57	59	6	0	—	17	10½	52	14	7½	M. D. Boggawn of Monfan.
- -	58	76	6	0	—	14	—	53	4	—	C. D. near Seven Churches.
- -	59	47	7	6	1	10	8	72	—	4½	M. D.
- -	60	80	9	0	1	12	11	131	13	4	C. D.
- -	61	82	7	0	—	19	10	81	6	4	C. D. to Clonaskra.
- -	62	53	9	0	2	4	1½	116	18	7½	M. D.
- -	63	33	10	0	2	2	9	177	8	3	C. D. to the Road.
- -	64	87	7	0	0	19	10	86	5	6	Collateral Drain to Mountshannon.
- -	65	81	10	0	2	16	4	223	3	—	M. D.
- -	66	75	11	0	2	16	7½	212	6	10½	C. D. to Clonaskra Hills.
- -	67	207	12	0	4	7	1	901	6	3	M. D.
23 & 25	68	107	9	0	2	4	1½	236	1	4½	M. D. between Boggawn, Monfan, and Bloomhill.
- -	- -	8	-	-	-	-	-	-	-	-	M. D. Gravel Clonaskra Hill.
25 - -	69	126	6	0	—	14	—	88	4	—	C. D. to Clonaskra.
- -	70	68	6	0	—	17	10½	60	15	6	M. D.
- -	71	64	6	0	—	14	—	44	16	—	C. D.
- -	72	76	9	0	2	4	1½	167	13	6	M. D.
- -	73	67	10	0	2	2	9	143	4	3	C. D.
- -	74	80	6	0	—	14	—	56	—	—	C. D.
- -	75	80	8	0	1	13	8½	134	16	8	M. D.
- -	76	85	9	0	1	12	11	139	18	—	C. D. to Ballyduff Hills.
- -	77	42	6	0	—	17	10½	37	10	9	M. D.
- -	78	66	8	0	1	4	7½	81	5	3	C. D.
- -	79	67	9	0	1	12	11	110	5	5	C. D.
- -	80	124	6	0	—	14	—	86	16	—	C. D. to Bloomhill.
- -	81	63	11	0	3	16	1	239	13	3	M. D.
- -	82	120	10	0	2	2	9	256	10	—	C. D.
- -	83	59	10	0	2	16	4	166	3	3	M. D. across County bounds.
- -	84	200	13	0	4	3	9	837	10	—	C. D. to Balnahown.

Estimate of the Proposed Drains—*continued.*

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.
		Perches.	Feet.	In^s.	£.	s.	d.	£.	s.	d.	
25 - -	85	85	10	0	2	2	9	181	13	9	C. D. Bloomhill.
- -	86	82	10	0	2	16	4	230	18	4	M. D.
- -	87	120	10	0	2	2	9	256	10	—	C. D. near Reanaun.
- -	88	378	6	0	—	14	—	251	6	2	C. D. round North Side Bloomhill.
- -	89	110	6	0	—	17	10½	98	0	3	M. D. near Reanaun.
- -	90	98	7	0	—	19	10	97	3	8	C. D. Lower Level Newtown.
- -	91	125	9	0	1	12	11	205	14	7	C. D.
- -	92	80	6	0	—	14	—	56	—	—	C. D. County bounds near Newtown:
- -	93	70	6	0	—	14	—	49	—	—	C. D. between Bloomhill and Curraghbuoy.
- -	94	182	6	0	—	14	—	127	8	—	C. D.
- -	95	40	8	0	1	4	7½	49	5	—	C. D.
- -	96	80	8	0	1	4	7½	93	10	—	C. D.
- -	97	60	7	0	—	19	10	59	10	—	C. D.
- -	98	60	6	0	—	14	—	42	—	—	C. D.
- -	99	80	7	0	—	19	10	79	6	8	C. D.
- -	100	80	6	0	—	14	—	56	—	—	C. D.
- -	101	92	9	0	1	12	11	151	8	4	C. D.
- -	102	165	-	-	-	-	-	-	-	-	Bloomhill in Gravel.
- -	103	134	6	0	—	14	—	93	16	—	C. D. between Bloomhill and Mountshannon.
- -	104	133	7	0	—	19	10	131	17	10	C. D.
- -	105	98	6	0	—	14	—	68	12	—	C. D.
- -	106	62	8	0	1	4	7½	76	6	9	C. D.
- -	107	181	7	0	—	19	10	179	10	—	C. D.
- -	108	105	5	0	2	8	7½	255	5	7½	M. D. Embankment.
- -	- -	60	23	0	48	16	1½	2,928	7	6	M. D. - D° Newtown River.
- -	- -	18	5	0	2	8	7½	43	15	3	M. D. - D°
- -	- -	20	6	0	—	17	10½	17	17	6	M. D. Excavation Clonbunnagh Bog.
- -	109	100	8	0	1	4	7½	123	2	6	C. D.
- -	110	36	8	0	1	13	8½	60	13	6	M. D.
- -	111	160	6	0	—	14	—	112	—	—	C. D.
- -	112	42	7	0	1	5	—	52	10	—	M. D.
- -	113	107	11	0	2	16	7½	302	18	10½	C. D. to Cunallenagh.
- -	114	53	7	0	1	5	—	66	5	—	M. D. Clonbunnagh Bog.
- -	115	120	8	0	1	4	7½	147	15	—	C. D.
- -	116	78	11	0	3	16	1	296	14	6	M. D.
- -	117	120	9	0	1	12	11	197	10	—	C. D.
- -	118	66	9	0	2	4	1½	145	12	3	M. D. to the Lands Clonbunnagh.
- -	119	270	-	-	-	-	-	-	-	-	M. D. in the - - D°
- -	120	63	7	0	1	5	—	78	15	—	M. D. On Bunahindley Bog.
- -	121	81	6	0	—	14	—	56	14	—	C. D.
- -	122	60	6	0	—	14	—	42	—	—	C. D.
- -	123	70	6	0	—	14	—	49	—	—	C. D.
- -	124	70	6	0	—	14	—	49	—	—	C D.
- -	125	100	10	0	2	2	9	213	15	—	C. D.
- -	126	80	8	0	1	13	8½	134	16	8	M. D.
- -	127	160	13	0	4	3	9	670	—	—	C. D.
- -	128	80	7	0	1	5	—	100	—	—	M. D.
- -	129	70	5	0	0	9	5	32	19	2	C. D.
- -	130	130	10	0	2	2	9	277	17	6	C. D.
- -	131	70	6	0	—	17	10½	62	11	3	M. D
- -	132	49	6	0	—	14	—	34	6	—	C. D.
- -	133	60	6	0	—	17	10½	53	12	6	M. D.
- -	134	60	7	0	—	19	10	59	10	—	C. D.
- -	135	50	6	0	—	17	10	44	13	9	M. D. to Brideswell, near Athlone.
- -	136	- -	-	-	-	-	-	-	-	-	Main Line from Grand Canal to Fadden Bog.
- -	137	230	12	0	3	12	1½	829	8	9	M. D. Fadden Bog. On Blackwater Bogs.
- -	138	100	7	0	—	19	10	90	3	4	C. D.
- -	139	129	6	0	—	14	—	90	6	—	C. D.
- -	140	65	7	0	—	19	10	64	9	2	C. D.
- -	141	60	7	0	—	19	10	59	10	—	C. D. to Derrylahan.
- -	142	70	8	0	1	13	8½	117	19	7	M. D.
- -	143	80	11	0	2	16	7½	226	10	—	C. D.
- -	144	60	8	0	1	13	8½	101	2	6	M. D.
- -	145	70	8	0	1	4	7½	86	3	9	C. D.
- -	146	43	6	0	—	17	10½	38	8	7½	M. D. to Clonbunnagh Lands.
- -	147	48	5	0	—	13	11¼	33	9	—	M. D.
- -	148	222	7	0	1	5	—	277	10	—	M. D.
- -	149	85	9	0	1	12	11	139	17	11	C. D.
- -	150	60	6	0	—	14	—	42	—	—	C. D. Lower Level, near Lisdaly.
- -	151	40	6	0	—	14	—	28	—	—	C. D.
- -	152	65	8	0	1	4	7½	80	—	7	C. D.
- -	153	95	7	0	—	19	10	94	4	2	C. D.

Estimate of the Proposed Drains—*continued*.

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.
		Perches.	Feet.	Inc^s	£.	s.	d.	£.	s.	d.	
25 - -	154	72	9	0	1	12	11	118	10	—	C. D.
- -	155	80	8	0	1	4	7½	98	10	—	C. D.
- -	156	60	6	0	—	14	—	42	—	—	C. D. lower Level, near Derrylahan.
- -	157	62	9	0	1	12	11	102	10	—	C. D. On Blackwater Bogs.
- -	158	80	7	0	—	19	10	79	6	8	C. D.
- -	159	60	6	0	—	14	—	42	—	—	C. D.
- -	160	57	9	0	1	12	11	98	6	3	C. D.
- -	161	80	9	0	1	12	11	131	13	4	C. D. ends the Drains on lower Level near Lucas's.
- -	162	25	16	0	23	14	6	593	2	6	M. D. Embankment, Blackwater.
- -	- -	10	8	0	5	15	8	57	16	3	M. D. On Blackwater Bogs.
- -	- -	45	6	0	—	17	10½	40	4	4½	M. D.
- -	163	13	-	-	-	-	-	-	-	-	M. D. Derry Kinniff.
- -	164	191	7	0	1	5	—	238	15	—	M. D. On Black-water Bogs.
- -	165	150	8	0	1	4	7½	184	13	9	M. D.
- -	166	130	6	0	—	14	—	91	—	—	M. D.
- -	167	80	6	0	—	17	10½	71	10	—	M. D.
- -	168	160	9	0	1	12	11	263	6	8	C. D.
- -	169	80	9	0	2	4	1½	176	10	—	M. D.
- -	170	160	9	0	1	12	11	263	6	8	C. D.
- -	171	80	10	0	2	16	4	225	6	8	M. D.
- -	172	70	6	0	—	14	—	49	—	—	C. D.
- -	173	75	6	0	—	14	—	52	10	—	C. D. near Loughfanler,
- -	174	60	6	0	—	14	—	42	—	—	C. D.
- -	175	80	9	0	1	12	11	131	13	4½	C. D.
- -	176	60	3	0	1	4	7½	73	17	6	C. D.
- -	177	132	9	0	2	4	1½	291	4	6	M. D.
- -	178	15	16	0	23	14	6	355	17	6	M. D. Embankment Loughfanler River.
- -	179	71	7	0	1	5	—	88	15	—	M. D. D° from Shannon Bridge to Athlone.
- -	180	27	-	-	-	-	-	-	-	-	C. D. Derry Kinniff.
- -	- -	293	8	0	1	4	7½	360	15	1½	C. D.
- -	181	23	-	-	-	-	-	-	-	-	M. D. Derry Kinniff.
- -	- -	102	8	0	1	13	8½	171	18	3	M. D.
- -	182	172	7	0	—	19	10	170	11	4	C. D.
- -	183	84	10	0	2	2	9	179	11	—	C. D.
- -	184	60	9	0	2	4	1½	132	7	6	Main Drain.
- -	185	81	9	0	1	12	11	133	6	3	Collateral Drain.
- -	186	84	7	0	—	19	10	69	8	4	C. D.
- -	187	80	7	0	1	5	—	100	—	—	M. D. Barrets Ichen.
- -	188	70	7	0	—	19	10	69	8	4	C. D.
- -	189	147	9	0	2	4	1½	324	6	4½	M. D. to Clongowney Road.
- -	190	230	-	-	-	-	-	-	-	-	M. D. in Clongowney Lands.
- -	191	173	8	0	1	13	8½	291	11	6½	M. D. in Derrywee.
- -	192	224	7	0	—	19	10	222	2	8	C. D. to Doon Road.
- -	193	58	6	0	—	17	10½	51	16	9	M. D. Derrywee.
- -	- -	30	14	0	19	5	2½	577	16	3	M. D. Embankment.
- -	194	184	7	0	—	19	10	182	9	4	C. D. Doon Road.
- -	195	76	10	0	2	2	9	162	9	—	C. D. Lackagh.
- -	196	44	8	0	1	13	8½	74	3	2	M. D.
- -	197	89	10	0	2	2	9	191	4	9	C. D.
- -	198	60	7	0	—	19	10	59	10	—	C. D.
- -	199	91	7	0	1	5	—	113	15	—	M. D. Lackagh.
- -	- -	15	10	0	2	16	4½	42	5	7½	M. D.
- -	200	60	7	0	—	19	10	59	10	—	C. D. Lackagh small Bog.
- -	201	85	7	0	1	5	—	106	5	—	M. D.
- -	202	50	7	0	—	19	10	49	11	8	C. D.
- -	203	118	7	0	1	5	—	147	10	—	M. D. to Corr.
- -	204	344	-	-	-	-	-	-	-	-	C. D. on Endrum Lands.
- -	205	105	5	0	—	9	5	49	8	9	C. D. Endrum small Bog.
- -	206	35	8	0	5	13	7½	198	16	10½	C. D. Embankment.
- -	207	130	6	0	—	14	—	91	—	—	C. D.
- -	08	90	9	0	1	12	11	148	2	6	C. D.
- -	209	73	9	0	1	12	11	120	2	11	C. D. Clonlim and Glelee Bog.
- -	210	80	8	0	1	4	7½	98	10	—	C. D.
- -	211	100	9	0	1	12	11	164	11	8	C. D.
- -	212	60	6	0	—	14	—	42	—	—	C. D. Clonlim Bog, near Blackwater.
- -	213	47	-	-	-	-	-	-	-	-	M. D. to Corr Hill.
- -	214	168	-	-	-	-	-	-	-	-	C. D. in Lackagh.
- -	215	57	7	0	—	19	10	56	10	6	C. D. Lackagh small Bog.
- -	216	240	-	-	-	-	-	-	-	-	C. D.

Estimate of the Proposed Drains—*continued.*

Nº of the BOG.	Nº of Drain.	Length of Drain.	Depth of Excavation		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.
		Perches.	Ft.	Incᵉ.	£.	s.	d.	£.	s.	d.	
25 - -	217	43	7	0	—	19	10	42	12	10	C. D. Doon Bog.
- -	218	85	8	0	1	4	7½	104	13	1½	C. D. Dº
- -	219	27	-	-	-	-	-	-	-	-	C. D.
- -	- -	70	7	0	—	19	10	69	8	4	C. D.
- -	220	160	8	0	1	4	7½	197	—	—	C. D.
- -	221	100	7	0	—	19	10	99	3	4	C. D. between Doon and Balnahown.
- -	222	80	7	0	—	19	10	79	6	8	C. D. near Cloneyderig.
- -	223	83	6	0	—	14	—	58	2	—	C. D.
- -	224	245	7	0	—	19	10	242	19	2	C. D. Biſhops Hill.
- -	225	140	9	0	1	12	11	230	8	4	C. D.
- -	226	63	8	0	1	4	7½	77	11	4½	C. D between Curraluska and Clongowny.
- -	227	160	7	0	—	19	10	158	13	4	
- -	228	92	10	0	2	2	9	196	13	—	
- -	229	100	11	0	2	16	7½	283	2	6	
- -	230	80	11	0	2	16	7½	226	10	—	
- -	231	172	-	-	-	-	-	-	-	-	M. D. Corr Hill, to the road from Ferbane to Athlone.
- -	232	246	-	-	-	-	-	-	-	-	C. D. to Ballylin Bog.
- -	233	49	8	0	1	4	7½	60	6	7½	C. D.
- -	234	80	8	0	1	4	7½	98	10	—	C. D.
- -	235	60	10	0	2	2	9	128	5	—	C D.
- -	236	60	-	-	-	-	-	-	-	-	C. D.
- -	237	100	13	0	4	3	9	418	15	—	C. D. Endrum Bog.
- -	238	70	-	-	-	-	-	-	-	-	C. D. Dº
- -	239	40	6	0	—	14	—	28	—	—	C. D. Ballylin Bog higher Level.
- -	240	60	6	0	—	14	—	42	—	—	C. D.
- -	241	80	7	0	—	19	10	79	6	8	C. D.
- -	242	78	7	0	—	19	10	77	7	0	C. D. Endrum and Ferbane Bog, higher Level.
- -	243	80	8	0	1	4	7½	98	10	0	C D.
- -	244	46	7	0	—	19	10	45	12	4	C. D. to Ballyvera.
- -	245	70	8	0	1	4	7½	86	3	9	C. D.
- -	246	58	10	0	2	2	9	123	19	6	C. D. Mayclare and Endrum.
- -	247	80	11	0	2	16	7½	226	10	—	C. D.
- -	248	60	10	0	2	2	9	128	5	0	C. D.
- -	249	130	7	0	—	19	10	128	18	4	C. D.
- -	250	95	7	0	—	19	10	94	4	2	C. D.
- -	251	80	7	0	—	19	10	79	6	8	C. D.
- -	252	38	6	0	—	14	—	26	12	—	C. D.
- -	253	84	-	-	-	-	-	-	-	-	C. D.
- -	254	62	8	0	1	4	7½	76	6	9	C. D.
- -	255	70	7	0	—	19	10	69	8	4	C. D.
- -	256	60	9	0	1	12	11	98	15	—	C. D.
- -	257	80	8	0	1	4	7½	98	10	—	C. D.
- -	258	51	6	0	—	14	—	35	14	—	C. D.
- -	259	70	9	0	1	12	11	115	4	2	C. D.
- -	260	60	8	0	1	4	7½	73	17	6	C. D.
- -	261	90	6	0	—	14	—	68	—	—	C D.
- -	262	71	5	0	—	14	—	49	14	—	M. D. Lamonahan Bog
- -	263	91	8	0	1	4	7½	112	—	10½	C. D.
- -	264	104	8	0	1	13	8½	175	5	8	M. D.
- -	265	125	8	0	1	4	7½	153	8	1½	C. D.
- -	266	172	7	0	—	19	10	170	11	4	C. D.
- -	267	80	6	0	—	14	—	56	—	—	C. D.
- -	268	80	6	0	—	14	—	56	—	—	C. D.
- -	269	80	5	0	—	9	5	37	13	4	C. D.
- -	270	104	5	0	—	14	—	72	16	—	M. D.
- -	271	298	6	0	—	14	—	212	6	6	C. D.
- -	272	80	5	0	—	9	5	37	13	4	C. D.
- -	273	183	-	-	-	-	-	-	-	-	
- -	274	191	8	0	1	13	8½	321	18	3½	M. D.
- -	275	60	10	0	2	16	4½	169	2	6	M. D.
- -	276	160	7	0	—	19	10	158	13	4	C. D.
- -	277	65	9	0	1	12	11	106	19	7	C. D.
- -	278	80	8	0	1	4	7½	98	10	—	C. D.
- -	279	45	6	6	—	15	10½	35	14	4½	C. D.
- -	280	80	10	0	2	16	4½	225	10	—	M. D.
- -	281	104	7	0	—	19	10	103	2	8	C D.
- -	282	80	8	0	1	4	7½	98	10	—	C. D.

Estimate of the Proposed Drains—*continued.*

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.	
		Perches.	Ft.	Inc'.	£.	s.	d.	£.	s.	d.		
25 - -	283	160	6	0	—	14	—	112	—	—	C. D.	Lamonahan Bog.
- -	284	60	-	-	-	-	-	-	-	-	M. D.	
- -	- -	55	14	0	5	19	1	327	9	7	M. D.	
- -	285	52	5	0	—	9	5	24	9	8	C. D.	
- -	- -	50	7	0	4	—	9	201	17	6	C. D. Embankment.	
- -	286	73	7	6	1	2	2	80	13	2	C. D.	
- -	287	115	7	0	—	19	10	114	—	10	C. D.	
- -	288	160	7	0	—	19	10	158	13	4	C. D.	
- -	289	240	7	6	1	2	2	266	—	—	C. D.	
- -	290	80	7	0	—	19	10	79	6	8	C. D.	
- -	291	80	7	0	—	19	10	79	6	8	C. D.	
- -	292	160	8	0	1	13	3½	269	13	4	M. D.	
- -	293	87	7	0	1	5	0	103	15	—	M. D.	
- -	294	194	10	0	2	2	9	414	13	6	C. D.	
- -	295	114	8	0	1	4	7½	140	7	3	C. D.	
- -	296	80	3	0	1	13	8½	134	16	8	M. D.	
- -	297	66	6	0	—	14	—	46	4	—	C. D.	
- -	298	80	8	0	1	13	8½	134	16	8	M. D.	
- -	299	93	-	-	-	-	-	-	-	-	M. D.	
- -	300	76	5	0	—	9	5	35	15	8	C. D.	
- -	301	70	11	0	2	16	7½	198	3	9	C. D.	
- -	302	80	7	0	—	19	10	79	6	8	C. D.	
- -	303	130	6	0	—	14	—	91	—	—	C. D.	
- -	304	175	9	0	1	12	11	288	—	5	C. D.	
- -	305	193	-	-	-	-	-	-	-	-	C. D.	
- -	306	78	5	0	—	9	5	36	14	6	C. D.	
- -	307	120	10	0	2	2	9	256	10	—	C. D.	
- -	308	80	7	0	—	19	10	79	6	8	C. D.	Lamonahan Bog.
- -	309	155	7	0	—	19	10	153	14	2	C. D.	
- -	310	89	6	0	—	14	—	62	6	—	C. D.	
- -	311	150	7	0	—	19	10	143	15	—	C. D.	
- -	312	93	11	6	4	1	6½	379	3	4½	Main Drain to Thumbeagh.	
- -	313	60	8	0	1	13	8½	101	2	6	M. D.	
- -	314	185	7	0	—	19	10	183	9	2	C. D.	
- -	315	60	7	0	1	5	—	75	—	—	M. D: Lamonahan.	
- -	316	27	7	0	—	19	10	26	15	6	C. D.	
- -	317	150	7	0	1	5	—	187	10	—	M. D.	
- -	313	- -	-	-	-	-	-	-	-	-	M. D. in Gravel Coolderther.	
- -	319	120	8	0	1	4	7½	147	15	—	C. D.	Bellair and Mount Prospect Bog.
- -	320	80	6	0	—	14	—	56	—	—	C. D.	
- -	321	100	7	0	—	19	10	99	3	4	C. D.	
- -	322	40	6	0	—	14	—	28	—	—	C. D.	
- -	323	40	5	0	—	9	5	18	16	8	C. D.	
- -	324	40	5	0	—	9	5	18	16	8	C. D.	
- -	325	101	6	0	—	14	—	70	14	—	C. D.	
- -	326	31	5	0	—	9	5	14	11	11	C. D.	
- -	327	85	7	0	—	19	10	84	5	10	C. D.	
- -	328	67	7	0	—	19	10	66	8	10	C. D.	
- -	329	80	7	0	—	19	10	79	6	8	C. D.	
- -	330	87	6	6	1	2	6	97	17	6	M. D.	
- -	331	79	7	0	1	5	—	98	15	—	M. D.	
- -	332	60	6	0	—	14	—	42	—	—	C. D.	
- -	333	72	6	0	—	14	—	50	3	—	C. D.	
- -	334	60	7	0	1	5	—	75	—	—	M. D.	
- -	335	80	8	0	1	4	7½	98	10	—	C. D.	
- -	336	54	7	0	1	5	—	67	10	—	M. D.	
- -	337	111	-	-	-	-	-	-	-	-	M. D. in Bellair Hill.	
- -	338	78	6	6	1	2	6	87	15	—	M. D.	
- -	339	190	5	0	—	9	5	89	9	2	C. D.	
- -	340	80	7	0	1	5	—	100	—	—	M. D.	
- -	341	80	10	0	2	2	9	171	—	—	C. D.	
- -	342	125	10	0	2	2	9	267	3	9	C. D.	
- -	343	73	8	6	1	7	3	99	9	3	C. D.	
- -	344	83	7	0	—	19	10	82	6	2	C. D.	
- -	345	47	6	0	—	14	—	32	18	—	C. D.	
- -	346	145	7	6	1	2	2	160	14	2	C. D.	
- -	347	80	10	0	2	16	4½	225	10	—	M. D.	

Estimate of the Proposed Drains—*continued*.

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.	
		Perches.	Feet.	Inc^s.	£.	s.	d.	£.	s.	d.		
25 - -	348	192	7	0	1	5	—	240	—	—	M. D.	Bellair and Mount-prospect.
- -	349	132	8	0	1	4	7½	162	10	6	C. D.	
- -	350	80	9	0	1	12	11	131	13	4	C. D.	
- -	351	80	11	0	2	16	7½	226	10	—	C. D.	
- -	352	160	9	0	1	12	11	263	6	8	C. D.	
- -	353	80	11	0	2	16	7½	226	10	—	C. D.	
- -	354	80	7	0	—	19	10	79	6	8	C. D. to the Road from Ballycumber to Moat.	
- -	355	146	8	0	1	4	7½	179	15	3	C. D.	
- -	356	80	12	0	3	12	1½	288	10	—	C. D.	
- -	357	100	13	0	4	3	9	418	15	—	C. D.	
- -	358	80	10	6	2	6	5½	185	16	8	C. D.	
- -	359	236	8	0	1	4	7½	290	11	6	C. D.	
- -	360	- -	-	-	-	-	-	-	-	-	M. D.	
- -	361	82	8	0	1	13	8½	138	4	1	M. D.	Willbrook and Creggan.
- -	362	80	12	0	4	7	1½	348	10	—	M. D.	
- -	363	80	6	0	—	14	—	56	—	—	C. D.	
- -	364	75	9	0	1	12	11	123	8	9	C. D.	
- -	365	27	-	-	-	-	-	-	-	-	C. D. Corr.	
- -	366	65	9	0	1	12	11	106	19	7	C. D. to the Lands of High Warren.	
- -	367	64	11	0	2	16	7½	181	4	—	C. D.	
- -	368	89	8	0	1	4	7½	109	11	7½	C. D.	
- -	369	80	8	0	1	4	7½	98	10	—	C. D.	
- -	370	95	7	0	—	19	10	94	4	2	C. D.	
- -	371	80	8	0	1	13	8½	134	16	8	M. D.	
- -	372	32	7	0	1	5	—	102	10	—	Main Drain.	
- -	- -	10	19	0	37	4	5	372	4	2	Embankment.	
- -	373	32	7	0	4	—	9	129	4	—	C. D. Embankment.	Willbrook and Creggan.
- -	- -	30	5	0	—	9	5	14	2	6	C. D.	
- -	374	53	10	0	2	2	9	113	5	9	C. D.	
- -	375	60	6	0	—	14	—	42	—	—	C. D.	
- -	376	86	-	-	-	-	-	-	-	-	M. D.	
- -	377	116	12	0	4	7	1½	505	6	6	M. D.	
- -	378	57	10	0	2	2	9	121	16	9	C. D.	
- -	379	60	8	0	1	4	7½	73	17	6	C. D.	
- -	380	55	5	0	—	9	5	25	17	11	C. D.	
- -	- -	10	14	0	4	15	3	47	12	6	C. D. Embankment.	
- -	381	120	8	0	1	4	7½	147	15	—	C. D.	
- -	382	22	10	0	2	16	4½	62	—	3	M. D.	
- -	383	35	-	-	-	-	-	-	-	-	M. D.	
- -	384	65	8	0	1	13	8½	109	11	—½	M. D.	Willbrook and Creggan.
- -	385	82	7	0	—	19	10	81	6	4	C. D.	
- -	386	150	8	0	1	4	7½	184	13	9	C. D.	
- -	387	84	7	0	—	19	10	83	6	—	C. D.	
- -	388	150	6	0	—	14	—	105	—	—	C. D.	
- -	389	- -	-	-	-	-	-	-	-	-		
- -	390	120	5	0	—	9	5	56	10	—	C. D.	Mayvoughly.
- -	391	60	8	0	1	4	7½	73	17	6	C. D.	
- -	392	177	8	0	1	13	8½	298	6	4½	M. D.	
- -	393	80	5	0	—	14	—	56	—	—	M. D.	
- -	394	220	8	0	1	4	7½	270	17	6	C. D.	
- -	395	80	11	0	3	16	1½	304	10	—	M. D	
- -	396	43	6	0	—	14	—	30	2	—	C. D.	
- -	397	103	10	0	2	16	4½	290	6	7½	M. D.	
- -	398	80	12	0	3	12	1½	288	10	—	C. D.	
- -	399	80	14	0	5	19	1	476	6	8		
- -	400	64	13	0	4	3	9	268	—	—		
- -	401	80	13	0	4	3	9	335	—	—	M. D.	
- -	402	80	13	0	5	5	10	423	6	8	C. D.	
- -	403	70	8	0	1	4	7½	86	3	9	C. D.	
- -	404	60	7	0	—	19	10	59	10	—	C. D.	
- -	405	40	6	0	—	14	—	28	—	—	M. D.	
- -	406	250	6	0	—	17	10½	223	8	9	C. D.	Ballymagleavy.
- -	407	80	6	0	—	14	—	56	—	—	C. D.	
- -	408	288	6	0	—	14	—	201	12	—	C. D.	
- -	409	125	6	0	—	14	—	87	10	—	C. D.	
- -	410	80	7	0	—	19	10	79	6	8	C. D.	

Estimate of the Proposed Drains—*continued.*

Nº of the BOG.	Nº of Drain	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.	
		Perches.	Feet.	Inc^s.	£.	s.	d.	£.	s.	d.		
	411	65	8	0	1	4	7½	80	—	7½	C. D.	Ballymagleavy.
- -	412	120	7	0	—	19	10	119	—	—	C. D.	
- -	413	80	7	0	—	19	10	79	6	8	C. D.	
- -	414	220	8	0	1	4	7½	270	17	6	C. D.	
- -	415	140	6	0	—	17	10½	125	2	6	M. D.	
- -	- -	13	-	-	-	-	-	-	-	-		
- -	416	80	5	0	—	14	—	56	—	—	M. D.	
- -	417	174	7	0	—	19	10	172	11	—	C. D.	
- -	418	243	9	0	2	4	1½	536	2	4½	M. D.	
- -	419	120	7	0	—	19	10	119	—	—	C. D.	
- -	420	268	7	0	—	19	10	265	15	4	C. D.	
- -	421	135	10	0	2	16	4½	380	10	7½	M. D.	
- -	422	57	6	0	—	14	—	39	18	—	C. D.	
- -	423	68	13	0	5	5	10	359	16	8	M. D.	

STATEMENT, shewing the Contents and different Qualities in each

PLANTATION

	Blackwater Bogs.			Boggan of Monfan Bog			Bloomhill Bog.			Clonbunnagh Bog.			Bunahindly Bog.			Mayclare Bog.		
Nos on the Map into which each Bog is divided into lesser denominations.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22.			23, 24.			25, 26, 27, 28, 29.			30.			31.			32.		
	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.	A.	R.	P.
Red Bog - - -	7,143	2	7	477	1	12	1,759	1	18	444	1	2	666	0	14	225	2	8
Cut away Bog - -	69	1	38	51	1	30	8	1	0	-	-	-	-	-	-	5	2	0
Improved Bog - -	55	3	22	-	-	-	36	2	4	1	2	0	1	1	37	39	3	0
Pasturable Bog - -	138	1	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Islands or Derries in Bog	65	2	5	0	3	15	7	2	6	-	-	-	-	-	-	-	-	-
TOTAL of each Bog	7,472	3	16	529	2	17	1,811	2	28	445	3	2	667	2	11	270	3	8

STATUTE

Red Bog - - -	11,571	1	19	773	0	30	2,849	3	20	719	2	21	1,078	3	32	365	1	17
Cut away Bog - -	112	2	8	83	1	11	13	1	13	-	-	-	-	-	-	8	3	25
Improved Bog - -	90	2	4	-	-	-	59	0	26	2	1	29	2	1	24	64	1	22
Pasturable Bog - -	224	0	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Islands or Derries in Bog	106	0	24	1	1	19	12	0	33	-	-	-	-	-	-	-	-	-
TOTAL of each Bog	12,104	3	4	857	3	20	2,934	2	17	722	0	10	1,081	1	16	438	2	24

Estimate of the Proposed DRAINS—*continued.*

N° of the BOG.	N° of Drain.	Length of Drain.	Depth of Excavation.		Price per Perch of Seven Yards lineal.			AMOUNT.			REMARKS.	
		Perches.	Feet.	Inc^s.	£.	s.	d.	£.	s.	d.		
25 - -	424	60	12	0	3	12	1½	216	7	6	C. D.	Ballymagleavy.
- -	425	83	9	0	1	12	11	136	12	1	C. D.	
- -	426	49	10	0	2	16	4½	138	2	4½	M. D.	
- -	427	90	9	0	1	12	11	148	2	6	C. D.	
- -	428	69	7	0	1	5	—	86	5	—	M. D.	
- -	429	122	10	0	2	2	9	260	15	6	C. D.	
- -	430	190	8	0	1	4	7½	233	18	9	C. D.	
					TOTAL - £.			63,435	7	1½		

Denomination of Bog respectively, in Plantation and Statute Acres.

MEASURE.

Endrum Bog	Lamonahan Bog.	Bellair and Prospect Bog	Creggan and Willbrook Bog	Mayvoughly Bog.	Ballymagleavy Bog.	Total of each Quality.
33, 34, 35.	36, 37.	38, 39, 40, 41, 42, 43, 44.	45, 46, 47.	48, 49.	50, 51, 52.	
A. R. P.	A. R. P.	A. R. P.	A. R. P.	A. R. P.	A. R. P.	A. R. P.
494 0 25	2,832 1 30	2,339 0 36	974 3 18	817 0 19	1,487 3 30	19,661 3 19
51 2 10	40 2 20	108 3 12	172 0 21	123 0 20	392 0 32	1,023 0 23
15 3 10	44 0 20	16 0 18	22 3 15	44 1 5	11 2 39	290 0 10
- - -	2 2 0	0 3 20	13 0 5	9 3 14	43 1 12	207 3 35
- - -	41 2 20	- - -	- - -	- - -	- - -	115 2 6
561 2 5	2,961 1 10	2,465 0 6	1,182 3 19	994 1 18	1,935 0 33	21,298 2 13

MEASURE.

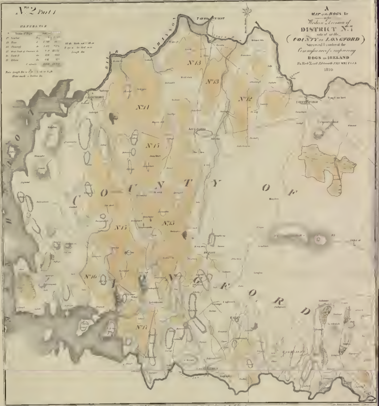
800 1 32	4,588 0 13	3,789 0 24	1,579 0 19	1,323 2 16	2,410 0 35	31,848 3 38
83 2 4	65 3 9	176 1 5	278 3 13	199 1 31	635 1 8	1,657 1 12
25 2 18	71 1 36	26 0 16	37 0 0	71 2 36	19 0 4	469 3 15
- - -	4 0 8	1 1 27	21 0 18	15 3 30	70 0 29	336 3 21
- - -	67 1 27	- - -	- - -	- - -	- - -	187 0 23
909 2 14	4,796 3 13	3,992 3 32	1,916 0 10	1,610 2 33	3,134 2 36	34,500 0 29

ESTIMATE of MASONRY on the proposed DRAINS.

			£.	s.	d.
3	Locks near Shannon Bridge, 9 feet 4 inches, each £.800		2,400	—	—
1	Bridge, Knocknaeuira, in road to Seven Churches		300	—	—
1	Bridge, Tullabeg		300	—	—
1	Bridge, road to Bloombill		3·0	—	—
1	Tunnel, Newtown River		200	—	—
1	Tunnel, Clonbunnagh		60	—	—
1	D° Bunnahindley		100	—	—
	Aqueduct over River Brusna		2,000	—	—
2	Bridges, Ballylammon and Fadden		600	—	—
	Tunnel at Blackwater		150	—	—
	D° at Loughfanla River		100	—	—
2	Locks, Derry Kinnift, 7 feet each, at £.700		1,400	—	—
	Inclined Plane, Cloniff		100	—	—
	D° Derrylahan		100	—	—
	D° Bloombill		100	—	—
1	Bridge at Clongowney		300	—	—
	Tunnel at Derrywee		80	—	—
1	Lock, Corr Hill, 9 feet		800	—	—
1	Bridge, Doon		300	—	—
1	D° Curraluska Hill		300	—	—
3	Locks, Corr Hill, two whereof 7 feet, £.700 each, and one 8 feet, £.800		2,200	—	—
	Tunnel, Endrum		80	—	—
	Inclined Plane, D°		100	—	—
	Inclined Plane, Mayclare Bog		100	—	—
1	Bridge, Corr Hill		300	—	—
	Inclined Plane, Derrynagloch		100	—	—
	D° Leaby		100	—	—
1	Bridge, Tumbeagh		300	—	—
1	Lock, D° 8 feet		800	—	—
2	Locks, Coolderiha, 8 feet each		1,600	—	—
1	Bridge, D°		300	—	—
4	Bridges between Bellair and Willbrook		1,200	—	—
2	Tunnel		180	—	—
	Inclined Plane, Willbrook		100	—	—
	Tunnel		80	—	—
	Mayvoughly Inclined Plane		100	—	—
	Ballymagleavy, six inclined Planes		600	—	—
	Bridge		300	—	—
			18,530	—	—
	Additional Expense for Locks inſtead of inclined Planes, at the following places. 1 at Derrylahan, 8 feet	£.600 — —	7,700	—	—
	1 at Bloomhill, 8 feet	600 — —			
	1 at Derrynagloch, 10 feet	700 — —			
	1 at Leabeg, 10 feet	700 — —			
	2 at Willbrook, 10 feet	1,400 — —			
	1 at Mayvoughly, 10 feet	700 — —			
	5 at Ballymagleavy, 8 feet	3,000 — —			
		£.	26,230	—	—

STATEMENT, Shewing the AVERAGE EXPENSE per Acre on each BOG separately, for Navigable Drains on such Levels as will answer for connecting them, exclusive of the Expense of Locks, and which should be averaged on the whole.

Average Expense per Acre.		
£. s. d.		
1. 17. 9¼.	Per Plantation Acre on Blackwater Bogs near the Shannon -	N^os 1 & 2.
5. 3. 4.	Per D° on D° near Clondelara - - - - -	N° 3.
2. 16. 8¼.	Per D° on D° near Leitra - - - - - -	N° 4.
2. 10. 11.	Per D° on D° near Clonfanla - - - - -	N° 5.
3. 9. 9.	Per D° on D° near Fadden - - - - -	N^os 6, 7, 8 & 9.
2. 9. 7½.	Per D° on D° near Endrum and Clonlein - - -	N^os 10, 11, 12 & 14.
3. 14. 5½.	Per D° on D° near Doon and Cloneyderig - -	N^os 15, 16, 17, 18, 19, 20, 21 & 22.
4. 2. 11¾.	Per D° - - on Boggawn of Monfan - - -	N^os 23 & 24.
3. 0. 3.	Per D° - - on Bloomhill Bogs - - - -	N^os 25, 26, 27, 28 & 29, exclusive of embankment.
3. 8. 4.	Per D° - - on Clonbunnagh Bog - - - -	N° 30, exclusive of embankment of Newtown.
2. 13. 8½.	Per D° - - Bunnahindlay Bog - - -	N° 31.
2. 6. 7.	Per D° - - Ballylammon and Mayclare - -	N° 32.
3. 10. 2¼.	Per D° - - Endrum, Ferhane and Ballylin -	N^os 33, 34 & 35.
2. 9. 0¾.	Per D° - - Lamonahan - - - -	N^os 36 & 37.
1. 10. 9½.	Per D° - - Loughill and Castledaly - -	N^os 38 & 39.
2. 3. 3½.	Per D° - - Bellair and Mount Prospect - -	N^os 40, 41, 42, 43 & 44.
3. 2. 9¼.	Per D° - - Creggan and Willbrook - -	N^os 45, 46 & 47.
3. 7. 2½.	Per D° - - Mayvoughly - - - -	N^os 48 & 49.
2. 4. 10.	Per D° - - Ballymagleavey - - - -	N^os 50, 51 & 52.
3. 0. 2.	Per D° - - On the whole Diſtrict.	



A
MAP of the BOGS &c
in the
Western Division of
DISTRICT No. 7
situated in the
(COUNTY of LONGFORD)
Surveyed & Levelled for the
Commissioners for improving
BOGS in IRELAND
By Richd. Lovell Edgeworth F.R.S. M.R.I.A. &c.
1810

Appendix, No. 8.

To the COMMISSIONERS for improving the BOGS of IRELAND.

The REPORT of RICHARD LOVELL EDGEWORTH,

on District No. 7.

First view of the Project.

WHEN I undertook the Survey of District No. 7, under the Commissioners for the improvement of the Bogs of Ireland, I had no very sanguine hopes that the result would enable me to recommend to the Board any extensive measure for their consideration. I mentioned my doubts to some of its Members, who encouraged me by the reasonable motive of being able, at no great Expense, to satisfy the Board and the Public decidedly either in favour of the project, or to adduce such facts and arguments as would put the scheme, as to this District, completely out of their view for ever.

Unfavourable reports concerning the Project.

I had been taught by the common reports current in the country that the greatest part of the Bogs on the borders of the Inny were lower than the surface of that River. I had been assured that the River itself flowed upon Bog of a depth that had hitherto been unfathomable; that various attempts had been made by the owners of these Bogs to drain and reclaim them; and that all their attempts had been totally abortive.

Prejudices against the Project soon removed.

It gives me great satisfaction, however, to have it in my power to contradict these opinions; and I am happy in being enabled to assure the Board, that the experience of every succeeding week has at once strengthened my hopes and increased my belief in the practicability of making these Bogs useful land.

I had feared that a prejudice which prevailed against the scheme of reclaiming large tracts of Bog would embarrass my proceedings; but this prejudice soon vanished when the people were informed of the real intentions of the Commissioners; and when they were assured, that such Bog as could be necessary for Turbary would not be meddled with in any other manner than to assist in making it fitter for fuel.

General Survey and Map.

In pursuance of my instructions I determined in the first place to make a general Survey of the District: for this purpose I enlarged Mr. Larkin's Map of Westmeath, as I was permitted to do, for such parts of my District as lay within that county; I was also permitted to make use of Major Taylor's admirable Maps of the Baronies of Abbyshrule and Rathcline, in the county of Longford; these I connected and verified with great care, in the manner detailed in Appendix, No. 1.

The Church of Edgeworthstown, which is nearly in the centre of the District, that you have done me the honour of committing to my charge, is situate in degree 53° 41′ 36″ of North latitude, and 7° 30′ 40″ W. longitude: the whole district contains 284,745 Irish, or 331,645 English Acres. It is bounded on the North by the small winding River Camlin; on the East and South-east, by the road from Finea to Ballynalack, which passes over Knock Jon, through the Crooked-wood near Wilson's Hospital, and through Bunbrusna to Ballynalack; the Southern boundary of the District, from Ballynalack to Ballymahon, and thence to the Shannon, is the River Inny; and the Western boundary is the Shannon, from the confluence of that River, with the Inny at Anna, to its confluence with the Camlin at Tarmoobarry. The greater part of this District lies in the county of Longford, and a small portion of it, on the banks of the Inny, is in the county of Westmeath.

It forms a considerable part of a large circular bason, surrounded by hills, that rise in the counties of Leitrim, Longford, Cavan, Westmeath, and Roscommon: it is probable, that these hills and the vallies between them, were covered formerly with trees; and from the remains and exuviæ of these Woods, the Bogs, which at present exist, have gradually been formed, fresh vegetation adding to the original morass.

Whether these morasses were at first formed by the destruction of whole forests, or merely by the stagnation of water in places where its current was choked by the fall of a few trees, and by accumulations of branches and leaves, carried down from the surrounding hills, is a question that cannot now be determined.

Professor Davy is of opinion that in many places where forests had grown undisturbed, the trees on the outside of the woods grew stronger than the rest, from their exposure to the air and sun; and that, when mankind attempted to establish themselves near these forests, they cut down the large trees on their borders, which opened the internal part, where the trees were weak and slender, to the influence of the wind, which, as is commonly to be seen in such circumstances, had immediate power to sweep down the whole of the internal part of the forest. The large timber obstructed the passage of vegetable recrement, and of earth falling toward the rivers; the weak timber in the internal part of the forest, after it had fallen, soon decayed, and became the food of future vegetation.

Mr. Kirwan observes, that wherever trees are found in Bogs, though the wood may be perfectly sound, the bark of the timber has uniformly disappeared, and the decomposition of this bark forms a considerable part of the nutritive substance of Morasses; notwithstanding

General Survey and Map. this circumstance, Tannin is not to be obtained in analysing Bogs; their antiseptic quality is however indisputable, for animal and vegetable substances are frequently found at a great depth in Bogs, without their seeming to have suffered any decay; these substances cannot have been deposited in them at a very remote period, because their form and texture is such as were common a few centuries ago.

In 1786 there were found, seventeen feet below the surface of a Bog in my district, a woollen coat of coarse but even net-work, exactly in the form of what is now called a *Spencer*. It fitted me as well as if it had been made by a modern Tailor.—A razor, with a wooden handle, some iron heads of Arrows, and large wooden bowls, some only half made, were also found, with the remains of turning tools; these were obviously the wreck of a workshop which was probably situate on the borders of a forest.—The Coat was presented by me to the Antiquarian Society.—These circumstances countenance the supposition that the encroachments of men upon forests destroyed the first barriers against the force of the wind, and that afterwards, according to Mr. Davy's suggestion, the trees of weaker growth, which had not room to expand, or air and sunshine to promote their increase, soon gave way to the elements.

Whatever may have been the cause of these Bogs, their texture is in this district very uniform.—The Bog becoming of course denser in proportion to its depth, and the colour and quality of its ashes becoming different at different depths.—With us, I have found but little manure in any Ashes, except in such as are yellow; Mr. Davy informs me that there is a species of white Ashes, containing gypsum, which may be found in Peat-moss, and that these Ashes are of great value to the farmer.

The sub-stratum of the whole of District No. 7, is calcareous, in the form of Limestone, Limestone-gravel, blue marly Clay, and very pure Marl.

The component parts, of the blue Limestone Clay that is found under the Bog near the Inny are as follow (This bed of Clay is more than ten feet thick next the banks of that River):—

	Gr.		
Carbonate of Lime	44	4	100 Grains.
Carbonate of Magnesia	1	4	
Alumine	27	2	
Silex	27	0	
	100		

White Marl found under the Bog near the Inny, opposite Coolnie, in a bed extending under the River, and in most places above Ten feet thick;

	Gr.		
Carbonate of Lime	87	3	100 Grains.
Vegetable matter, or Bog-stuff	10	7	
Alumine	1	0	
Silex	0	9	
Oxyd of Iron	0	1	
	100		

Blue Clay found under the Bog near the Shannon, in a stratum of about 3 feet in thickness,

	Gr.		
Carbonate of Lime	53	0	100 Grains.
Alumine	36	0	
Silex	11	0	
	100		

The Limestone-gravel has the plainest indications of having been fragments of Rock reduced to the globular form of pebbles by the motion of water; and in the greatest part of them, the marly Clay, had probably been superinduced over the Rock and Gravel before the formation of the Bogs. Its softness arises from its having been long covered with water, which by the intervention of small pebbles had mixed itself with the Clay, and had rendered it easily plastic; depositions from the recrements of Vegetables have no doubt been added. To enter into a chemical analysis of the small portions of these different substances seems foreign to my present purpose, which is to give such practical and practicable means as may be made use of to bring the Bogs of this District into immediate and profitable cultivation. It is sufficient to point out, that the form of the County, and the situation of its Rivers, give us reason to suppose, that the formation of its Bogs has arisen from the accidental obstructions of those channels by which any animal substances are carried to the Ocean.

Conjectures on the formation of Bogs. A circumstance attending one small Lake near Ballinalee in the county of Longford corroborates this opinion, as it has been long the repository of the bones and horns of red Deer, which had probably been swept from the surrounding hills by floods, and retained there for want of some outlet by which they might have been carried off. It is probable that they have been preserved from putrefaction by the antiseptic quality of the Bog on which they lie.

Before I enter upon a description of the Bogs of this District, or the means of improving them, it will be necessary to speak of those Rivers by which the water of the Bogs is carried off to the Sea. The Rivers in this District, are the Inny, the Camlin, and the Shannon.

As

Rivers described in District No 1

The Inny.

As the Inny is the great receptacle for all the superfluous water in the eastern and southern part of this District, I shall briefly report my researches as to this River. The Inny is a slow stream from Lough-Sheelan till it reaches Abby-Shrule. Its course winds so much as to retard considerably the effect of its natural descent. In many places it is a fine deep River, capable of being rendered navigable at a small expense, and to great national advantage. It has for thirteen miles but little current; from Finea near Lough-Kinnail to the Shannon, its total fall is only ninety feet seven inches (vide Appendix No. 3.), the Levels were taken backward and forward by Mr. William Edgeworth, and the whole was verified through every station by me, so that I have reason to depend upon the accuracy of the operation. I bestowed particular attention upon this part of the business, because, after I had gone in a Boat down a considerable part of the River with Mr. Townsend, who is Engineer of the District next to mine, I saw that a large portion of flooded land upon its banks might be easily reclaimed from the River, and might be highly improved by irrigation, and that several miles of inland navigation might be obtained at a trifling expense.

Description of the River Inny.

Flooded Land on the Banks of the Inny.

Mr. Townsend, as we sounded the River with a graduated rod, proposed to attach the rod to the Boat perpendicularly, so that it might slide up and down in a groove at the stern of the Boat; we soon perceived that the end of the rod might be caught by Rocks and impediments at the bottom of the River; but from this hint I applied myself to the invention of a machine for sounding Rivers, which has perfectly answered my expectations. This Machine gives with sufficient accuracy the progress of the Boat, and with perfect precision the height of every Rock, indeed of every loose stone in the line of its course; so that a complete Section of the water and its bed is taken and delineated with perfect accuracy at one operation. A description of this Machine, with a drawing, is given in Appendix No. 3. And also Sections taken by it of every part of the Inny from its source to Abby-Shrule, where the first great Mill which obstructs the stream is situate. By inspecting these Sections it appears, that several miles of the River may be immediately opened for navigation.

Machines for sounding Rivers used on the Inny.

Where the banks are bold a towing path may be easily made, so as to serve at the same time for an embankment, to prevent the neighbouring meadow from being overflowed; below the lake there is but one weir called Dalton's Weir, south of Lough Derevereagh, that is of much importance (vide last page of Appendix, No. 5).

Towing-path to serve as Embankment on the Inny.

Weirs on the Inny.

Perhaps Ten thousand Pounds would accomplish this desirable improvement, for which 1,500, or 2,000 acres of land might become worth at least thirty Shillings per acre more than it yields in its present state.

Improvement of flooded Land on the Banks of the Inny.

It is true that the exorbitant price demanded for some of the weirs of this River is a discouragement to every attempt to improve it, but if the Proprietors of the meadows on its banks were to combine, these demands might by their influence be brought within a reasonable compass.

A new Road from Edgeworthstown to Cool, is also traced on Map No. 1, which would obviously shorten the communication between the Inny and all the Country west of that River.

To render the Navigation safe and commodious in all weathers it would be expedient to make a cut from the place where the Inny enters Lough Derevereagh, to the place where it issues from it on the west banks of that lake; another cut to avoid the lake between Ballynalack and Ballycorky would be advisable; these proposed cuts are marked upon the Maps (No. 1 and 2); the former would not cost more than Five hundred Pounds, nor the latter more than Three hundred Pounds, if they were only fourteen feet wide and six feet deep.

Navigation of the Inny proposed.

Few Rivers present for such a length of way so much facility for water-carriage. The bending of its course shelters it surprizingly from the wind, so much so, that on a day when it was not pleasant to venture a sail-boat on lake Derevereagh the surface of the River was as smooth as a mirror.

For further particulars relative to the Inny, see Appendix 5.

The River Camlin.

The Camlin, which is the northern boundary of District No. 7, is next to be described; it takes its rise in the Town of Granard, from one of the numerous springs in that Town; it is at first but a small stream; which as it falls down the hill of Granard, divides near Higginstown, from which place to Lough Derevereagh the fall is 189 feet 10 inches.

Fall of Camlin from Higgin's Town to Lough Derevereagh.

Its course is uncommonly winding, a circumstance that arises from the flatness of the valley through which it runs, of course this valley is flooded every winter to the extent, by estimation, of a Thousand acres.

To improve this large tract of low ground, a considerable part of which lies on Bog, is an object of moment, and well worthy the consideration of the Board, both on account of the increasing value of the land lying on each side of the River, and on account of the facility and of the trifling Expense at which a communication might be made between Longford and the vicinity of Granard, the two principal Towns of this County; an extensive intercourse between the north and the north-west of Ireland, and these Towns, has been long established, and by rendering this River navigable, each of them would have the advantages of any line of Navigation from the Royal Canal that might be made near either; beside this, great convenience would accrue to many parts of the Country by supplying it with fuel, which, strange to tell, is very scarce in some parts of the County of Longford.

Communication proposed by means of the Camlin between Longford and Granard.

There is a Mill at Longford which obstructs the Camlin very much. This Mill should be purchased by the Proprietors of the grounds which are overflowed; they would make a most advantageous purchase; and a Mill might be constructed near the Town, which would compensate for much of the Expense.

Camlin Mill on this River obstructs its Navigation

A Canal

Camlin River.

Camlin Canal proposed.

A Canal should be cut north of the infirmary, which might terminate at the Camlin beyond the barracks, where a Lock and a new Mill, with an increased fall, might be built.

Falls on this River.

The River from the Mill-head at Longford, to the tail-race at Mr. Major's Mill, which is within about a mile of Granard, might be made navigable by four moderate Locks, and by slight embankment. The fall to Kilshrully is twenty-six feet, at Carrick-glass, seven feet, &c. The whole fall is fifty-five feet.

I have not thought it necessary to make an exact estimate; but if the Proprietors of the soil united to execute this work, with judicious management they would gain twenty per cent. on the money it would cost.

Convulsion of the Earth at Rine.

There is nothing further remarkable on the River Camlin, except the effects of an extraordinary convulsion of the Bog of Rine (or Killoe) which took place near the Bridge of Rine. In the night of the 16th December 1809, during a thunder-storm, about 20 acres of the Bog burst asunder in numerous places, leaving chasms of many perches in length, and of various breadths, from ten feet to three inches; the rifts were in general parallel to the River but in some places the smaller rifts were at right angles to it; not only the Bog, but the bed of the River was forced upward; the boggy bottom filling up the channel of the River, and rising three or four feet above its former banks: in a few hours One hundred and seventy acres of land were by these means overflowed, and they continued in that state for many months, till the bed of the River was cleared by much labour and at considerable expense.

I repaired to the spot shortly after the event, and I examined it with great care, without being able to assign an adequate cause for what had happened.

As the Bog of Rine lies in my District I thought proper to beſtow some pains in ascertaining all the circumstances of this Phenomenon. I took the levels of the Bog to discover whether it had sunk partially in any considerable degree.

I bored it in a great number of places, to make myself acquainted with the texture of the Bog, and with the nature of the sub-strata on which it lies, and to discover whether any large chasm or cavern could be found, into which the water of the Bog might have sunk; for the Bog, which had been uncommonly wet, soon became drier than any other Bog in the country. The water, however, which was found in all the rifts at three feet from the surface, continued to remain at that depth with little variation: and even since a passage has been opened, and that all the flooded meadows have become dry, the water still remains in the bottom of the chasms.

Causes of the Convulsion in the Bog of Rine conjectured.

Various causes have been assigned for this phenomenon; the most obvious is that the Bog had been undermined by rains, or by the swelling of the River, or by water descending under the Bog from the neighbouring rising grounds, and that in consequence the whole Bog slid toward the River, breaking into chasms or rifts from the resistance which it met with in passing over hard and irregular ground at the bottom of the Bog; it was also suggested that a large chasm had been suddenly formed underneath the Bog, by the falling in of a subterranean vault, and that this chasm had swallowed part of the Bog, and had, by the undulation occasioned in its fall, forced up the bottom of the River, and broke the Bog into the rifts which appear upon its surface; but no such chasms or cavern could be discovered, and the Bog had not sunk in any particular place.

To account for this phenomenon, other persons suppose that there had been a slight shock of an earthquake, this idea generally prevailed among the people on the spot, and this opinion is not contrary to experience; partial earthquakes have occurred in various parts of the world, which have happened at the same time that violent earthquakes or eruptions of volcanoes took place at great distances.

Conjectures on the causes of this Phenomenon.

As for instance, in England, in 1755, a pond in the Town of Luton in Bedfordshire, in which there had been but little water for some weeks, suddenly filled, and a copious sediment was thrown up from the bottom at the precise time of the earthquake at Lisbon, the water continuing to overflow for some hours, and then all remaining quiet as usual.

Last September the same pond in Luton began to overflow suddenly, which created alarm in the minds of the inhabitants, who apprehended that this circumstance was the indication of some earthquake on the Continent; this was afterwards known to have been actually the case.

It is remarkable that several earthquakes were felt about the sixteenth of December 1809, in distant countries, when the phenomenon, of which I have given an account, happened at Rine in the county of Longford; and though the distance between the places where they occurred and Ireland, is so very great as to make it improbable, it is not absolutely impossible that a communication may exist between them.

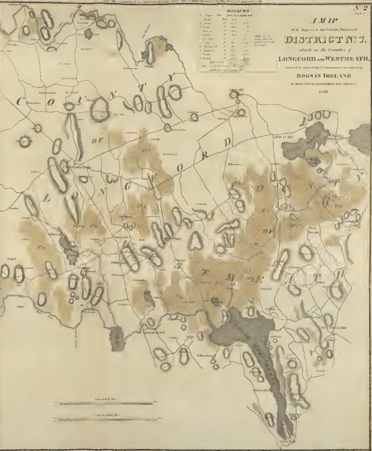
The Shannon.

Having thus described the Inny and the Camlin, the Shannon yet remains to be considered: This River is a boundary of District, No. 7, but none of the Bogs in that District lie upon its banks; there are several thousand acres of land between the great Bogs and the River, into which they pour their water by the intervention of streams that are noticed in the Maps.

The Shannon has been so accurately and so often described that it is unnecessary for me to give any details with respect to its course, or the levels of the water; indeed it can be considered in this District only as a receptacle for the waters of the Camlin or the Inny; and as there is a considerable fall from Shrule to the Shannon it can never be necessary to make this River deeper in carrying on any operations on the Inny.

Before the Camlin enters the Shannon it has sufficient fall to carry off the water that now overflows the Meadow on its banks.

I cannot



N° 2
Part 2

A MAP
of the Bogs in the Eastern Division of
DISTRICT N° 7,
situate in the Counties of
LONGFORD AND WESTMEATH,
Surveyed by order of the Commissioners for improving
BOGS IN IRELAND
by RICH LOVELL EDGEWORTH F.R.S. M.R.I.A.
1810

The Shannon.

Rocks that obstruct Inny and Shannon Rivers.

I cannot quit this subject without observing, that the rocks which obstruct the course of the Inny, from Newcastle to Ballymahon, and in two shallows between that place and the Shannon, extend to a great distance across the country on each side of the River, so that it would be extremely expensive to cut any channel, more particularly as these rocks lie in very oblique directions, and in strata of no great thickness, so that to blast them would be perhaps more expensive.

Division of the Bogs in District No. 7.

I now proceed to the division of the Bogs in district No. 7.—These Bogs are divided into two great masses, one towards the east lying on each side of the Inny, the other lying westward near the Shannon; a few smaller detached Bogs are scattered over the country.

Beside these Bogs there are large tracts of marshy grounds that are overflowed in winter, which seem to come within the view of the Commissioners, as they are interspersed with Bog, and as they may be beneficially reclaimed at a small expense; there lies also a large quantity of Meadow thus circumstanced on the borders of the Camlin, which, as I have already mentioned, has been surveyed with a view to its improvement; the Bogs on both banks of the Inny stretch from Lough Sheelin to Lough Derevercagh, gradually sloping from the former of these lakes towards the latter, and forming in many places the bed of the Inny.

Bogs surveyed, velled, and bored.

In pursuance of your instructions (Section 10 and 14,) I had those Bogs surveyed and bored, and their levels taken with great precision. Cautious at the beginning of these operations, I explored the bottom of these Bogs with more care than I bestowed on those which I afterwards examined, that I might thus have it in my power to lay before you such accurate and frequent Sections (Section 11) of these Bogs, as should fully supply the information required in my instructions, and should leave nothing to be done hereafter as to this part of my orders.

Finding in my progress a general uniformity in the different Bogs of this country, I did not think it necessary to continue such minute investigation of the western Bogs. Having engaged Surveyors, (Instructions §. 2.) I laid out lines parallel to each other, at a distance of a quarter of a mile asunder; these lines were levelled at stations which were half a quarter of a mile from each other; and at each of these stations the Bog was bored to the hard ground; the different strata through which the boring-Irons passed, and in particular the strata at the bottom, and those which were next the bottom, were preserved, so that a distinct knowledge of the soil on which these Bogs lie has been obtained; and the particular levels are to be seen in the annexed Sections, and in Maps No. 1, 2, 3, and 4, and in the explanations in Appendix, (No. 1.)

I have examined with care the results of these different operations; and I have considered every part of each of these Bogs, to ascertain the proper places for Drains or Canals, and the places from which earth may be obtained to consolidate their surface. To retain in my memory, or to point out to others, what struck me upon the examination of so many different divisions of Bog, would have been extremely difficult had I not been assisted by an invention of Mr. William Edgeworth's.

Stations marked by Mr. W. E. by letters and figures cut in the Bog.

He had the number of every station which was bored or levelled actually cut out in large figures or letters of about six feet long on the surface of the Bogs, and a heap of turf placed near each letter, which guided the eye upon the Bog, so that the operations performed at each station might be verified, and referred to at any time. These marks are also laid down on the Maps in their proper places; so that after a Bog has been surveyed all the intended works may be explained in writing, for workmen or their overseers. These marks have remained for many months unchanged, and they will probably continue legible for a great while; at all events they may be easily renewed.

Bogs decline to Lough Derevereagh.

Swells in the Bogs how marked on Maps.

The whole of these Bogs decline to Lough Derevereagh; but each of them has considerable swells in a direction nearly parallel to the River; these swells seldom appear in the middle of the Bog, but are much nearer to the high land than to the Inny. The small streams that surround the Bog on the side of the land serve to carry off the water that falls on that side, and the Rivers carry off what falls on the other. The course of these elevations in each of the Bogs is marked on the Maps No. 3 and 4, by shading, which nearly points out the highest part by inspection; and the exact levels of the surface of the Bogs, and the depth of the Bogs, at the intervals of a quarter of a mile in each direction, both in length and breadth, on the Inny Bogs, are laid down in Maps, Nos. 1, 2, 3, so as to be obvious upon examination. The fall, however, on both sides of these swells is amply sufficient for drainage, so far as draining is necessary for the improvement of these Bogs.

Drains traced on Maps, where necessary.

Such Drains as I think necessary are traced upon Maps, No. 1 and 2, in red ink; and any Person who undertakes the improvement of any of these Bogs, may in his closet lay down whatever lines of Canals for Carriage, or for Drains, he may think proper, so that when the whole or any part of these Maps are copied or traced, the tracings will immediately become working plans for carrying on actual operations of any sort.

Opinion against deep draining of Bogs in District No. 7.

Opinion against Canals in Bogs for carrying out Clay, &c.

Depths and levels laid down on Maps by letters and figures.

It is not, in my opinion, expedient to Drain the Bogs in District No. 7, by Canals cut to the bottom of the Bogs; nor do I approve of employing Canals in this District for carrying out manure of any sort; therefore I have not laid down the levels for Canals upon the Maps, because that may be done by any person who thinks them necessary: but instead of lines of Canals I have laid down letters and figures, which denote the depths and levels of the Bogs. To these there is an index at the end of this Report. In rejecting large and deep Drains, I speak only of my own District. In other places, it may be advisable, but in the

Draining.

Reasons for not advising deep draining on Inny Bogs.

Inny Bogs, which are in some places, between forty and fifty feet deep, if Drains of forty or fifty feet deep and twenty feet wide, were cut at the distance of ten perches from each other, the Bog would not, in my opinion, become fertile, though the expense would be prodigious.

Observe, the ground immediately near to a hole from which Turf has been cut, at ten, or even at five yards, from what is called the surface of the Bog, and you will find it but little drier, and certainly not in the least more fertile than what is a hundred yards more distant. Indeed no visible change takes place from this expensive mode of improvement.

Instances of the inefficacy of mere draining.

Stuff thrown out of Drains, more fertile than other parts of the Bog.

Reasons against deep draining.

Mr. Wakefield Fact furnished by him.

I have carefully examined many places where former attempts had been made to improve red Bog, particularly in Bogs No. 1, and No. 9, as may be seen in Appendix No. 5. Drains of six or seven feet wide, and as many feet deep, had been made from the centre of the Bog to the streams that separate it from dry land; these were about twenty perches asunder, and though they had been made upwards of twenty years ago, the land between them was not in any respect different from what had not been drained. In (the float-Bog) No. 2, two large Drains had been made fifty years ago to enclose a road. They are at present open, and only thirty-two feet distant from each other; but the ground which had been marked out for a road between these ditches remains nearly in the same state as the Bog on each side of it; excepting indeed, the narrow banks formed by the stuff thrown out of the Drains; this stuff, whether from its becoming drier, or from its exposure to the air, certainly in all cases, where it is turned up, does become more capable of supporting vegetation than it was in its former state. I learn, therefore, from experiments made long ago, and from what has repeatedly passed before my eyes, that the improvement of these Bogs does not require many or deep Drains.* I have lately received from Mr. Edward Wakefield a strong corroboration of this opinion. He informs me, that a gentleman of much respectability, after having literally sunk Ten thousand Pounds in draining one part of a Bog, has since succeeded in improving another part of the same Bog at a small expense, by Surface-Draining. I think it will not be improper in this place to mention an improvement which I made upon part of a Bog of my own, about twenty-five years ago. The Bog and Moor consisted of twenty-seven acres. It was on the borders of my own Turf-Bog, and part of it had been partially cut away, but there were still four or five feet of turf above whitish sterile clay; I enclosed it with a seven-feet ditch, cut down to the white clay, where it was necessary to preserve a fall for the water; but in other places the ditch was not cut to the bottom of the Bog, only a few slight surface-drains of small dimensions were cut in proper places. The Bog, which as the summer was dry, could bear cattle, was ploughed with a ſkinning-plough, and the stuff that had been turned up was burned, yielding a large quantity of red ashes; a coat of Limestone Gravel of an inch and half in thickness was spread on one third of this ground; another third was covered with quick-lime; and the remaining third with marle, which was brought from the distance of a quarter of a mile; with respect to the quantity of each of these materials, I followed no other rule than to limit the expense to what the Limestone Gravel on the first portion of Bog had cost, knowing that the worth of every improvement is to be determined by comparing the produce with the money expended. The experiment succeeded far beyond my hopes; no material difference appeared in the returns made by these three portions of Bog during five years, whilst it remained in my hands.

Account of an Improvement on a Bog of Mr. Edgeworth's without deep draining.

At the commencement of the business a tenant, to whom I had let the neighbouring land, declined to take this Farm at half-a-guinea per acre; I took it into my own hands; and I accounted regularly with my agent for that rent yearly. I never had one hundred pounds capital employed; and by an accurate account now in my possession, it appears, that after having my capital reimbursed, and after the payment of rent and every contingent expense, including wear and tear of instruments of husbandry, and of overseer's wages, I had at the end of five years gained seventeen pounds clear profit; and at that period, when the land was in Meadow, I let it to the farmer who had before refused it at half-a-guinea, at the rent of Thirty shillings per acre, on a lease for his own life.—It is now worth double that rent. This experiment is not related as evidence of the success of surface-draining, but as a proof that marle, limestone-gravel, or lime, if applied in proper quantities are nearly of equal use.

Improvement made by Bishop of Kildare.

The most judicious mode of improvement of Bog, that I have ever met with, is clearly and ably described in a Note to Mr. Griffith's Report, which I saw when mine was nearly transcribed. Here the hard bottom of the Bog was at the greatest depth only twenty-two feet below the surface. The Bishop of Kildare who directed this improvement wisely dug to the bottom, because the expense was not too great in this instance; but where Bogs are from forty to forty-seven feet deep, the cost could never be repaid by any mode of treatment with which I am acquainted.

Form of Drains laid down in Map No. 1.

As to the forms of the few Drains which are laid down in the Map, No. 1, I propose that they should be made with perpendicular sides, which I prefer to those which are made either with a considerable talus, or in steps; I once thought the latter mode the best, but from observations made on common Turf-Bogs, and from reasoning on the subject, I have changed my opinion.

The sides of Bog-Holes, as they are called, where turf (or peat) has been cut, are always perpendicular, and unless water lodges at the bottom of the Holes, and melts away the foundation of the Bank, it seldom gives way. All Drains, (except Canals,) in Bogs I would make narrow, viz. 5 feet by 3, to save expense; to secure the bottom of these Drains, and

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* Eaton on Bogs.

to

Drains.

to preserve the water in a narrow channel, I propose to make the sole of the Drain an inverted arch, as represented (Fig. 4.) in the annexed plate.

Sole or bottom should be an inverted Arch. See Fig 4

Deep Drains.

Though Mr. E. disapproves of them, he adds hints to make them more useful.

Pumps to be worked by Windmills.

Though I disapprove of making large and deep Drains in my District, yet it may be proper for me here to communicate to the Board some observations upon this subject, which may be useful in other Districts where Canals or deep Drains are deemed advisable.

In the first place, there are some situations where there are depositions of water lower in particular places than the general level of proposed Canals, and lower than the neighbouring Rivers, in such places pumps may be sunk, which may be worked by such windmills as are used in the fens in Lincolnshire.

Coffre-dams or Caisons.

Archimedes' Water-screw. See Appendix, No. 3.

In the next place, there are in some Bogs depôts of Marle, where that manure is not to be found in the vicinity; in these situations the most certain, and, in the end, the cheapest, method, is to form a Coffre-dam or Caisson of large extent; pointed planks driven through the Bog to the hard bottom will be sufficient, if placed circularly to support the Bog-stuff on the outside, whilst the Workmen are removing the stuff within; after the excavation has been made the whole must be puddled, and kept free from water by an Archimedes Water-Screw, and a Windmill, as described in Appendix, No. 3.

Such a machine may also be advantageously employed in raising Marle or Soft Limestone Clay from the bottoms of Rivers, where they happen to abound; in such situations the Windmills and Screw-pumps, as they are popularly called, must be erected upon floats in the River, and the Screw-pumps must be placed at an angle not exceeding twenty-five degrees.

Small shores and bridges left over them.

They will then, if properly made, raise semi-fluid materials with certainty. In this way of working to raise Marle there will be a considerable waste of power from friction; but the power of the wind is so great, where it can be applied safely, and where continuity of work is not required, that small mechanical resistance from friction is easily overcome. I am aware that the wind is not an economic power; that all machinery that has been hitherto exposed to its influence is liable to frequent accidents and to expensive repairs; and the force employed always bears but a small proportion to the bulk and cost of the organ: Therefore good Mechanics are not disposed to call it into use except in particular situations. Not having ever seen Steam Engines worked by Turf, I cannot recommend their use in draining or irrigating Bogs; but it is probable that they may be employed with advantage. In the last place, with respect to Drains in Bogs, it will be necessary to have frequent Bridges or Passages from one part of the Bog to another. These Passages may be left untouched in cutting the Drains, and by scooping out the earth underneath them, small shores may be made for the water from one part of the Drains to the other, so that in fact, where the size of the Drains makes it worth while to do so, half the cutting of these Drains may be spared, because half the surface may be left for the Passages.

Seton-plough. See Appendix, No. 3.

How far it may be useful to make subterranean passages to drain Bogs, I have not had sufficient opportunity to determine, but I have made some experiments on this subject with an instrument, which I call a Seton-plough. This instrument is described in Appendix, N° 3.

Canals for transport of Clay, Manure, &c.

Canals for transport of Clay, Gravel, &c.

Not advisable in District No. 7.

But where such Canals are advisable, a machine for loading may be useful. See Appendix, No. 2.

Wooden Locks recommended instead of stone.

Beside the use of Canals and wide Trenches for draining Bogs, it is proposed by some Engineers to employ Canals as the means of transporting Clay, Limestone-Gravel, or other earths or manures over the whole surface of a Bog; it is obvious that this must be done either with or without the intervention of wheelbarrows. In the latter case the Canals must be so near each other as to permit the stuff that is emptied from the Boats to be immediately spread with a shovel: in the former, the load must be first emptied on the banks of the Canal, and afterwards be thrown into wheelbarrows, thus requiring to be raised twice, which will occasion double cost in a most material article of expense. Though in this district such a proceeding is not advisable, it may be practised perhaps elsewhere; and to facilitate putting out Clay by Boats I have described in Appendix No 2, a Machine which I used in 1772 on the Rhone. Where this system of Canals is adopted I should recommend wooden Locks instead of stone; I would make them narrow, and frame them so as to be easily removable from place to place.

Having thus presumed to give a decided opinion against cutting large Canals in the Bogs in my District, either for the purpose of Drainage or of carriage of Manure, I shall proceed to point out the means which I would pursue in attempting to reclaim a large portion of Bog.

Means proposed by Mr. E. for improving Bogs.

I would in the first place cut off all the springs and sloughs by appropriate Drains, and then, whenever a Bog, as at No 8, is covered with thin heath or weak plants of any other sort, I should endeavour in the first place to burn off the rough surface in a dry summer, merely by setting fire to the heath, and permitting the fire to spread itself wherever it could meet with fuel. In other Bogs where the roots of plants are strong and deeply sunk under the surface, I would immediately proceed to turn up the whole of the Bog with a long Loy, a tool which is common in the western part of Ireland; besides which I should require grubbing-tools.

As I advanced I would cut narrow Drains of eighteen inches deep, with narrow Essex draining-tools, wherever water lodged on the surface; and Drains of fit dimensions wherever springs occurred which I had not previously discovered.

Burning the surface of Bogs.

The thick tough surface of the Bog should be piled up in ridges to dry, and where the Turf so dried yielded Ashes that contained Manure, as much of it as is possible should be burned in the rows as they stand, to save the expense of making it into heaps; what remains unburned

burned after this attempt should be collected in heaps and burned to ashes. The next operation is to put out some kind of Clay upon the Ashes after they have been spread, taking care soon to cover them with earth, to prevent them from being blown away.

Portable wooden rail-ways recommended.

Have been tried.

I propose for this purpose to employ wooden portable Rail-ways, shod with iron; upon these portable Rail-ways appropriate carriages are to be employed; these are made to empty at either side of the Rail-way, and when loaded with half a ton of earth, one of them can be easily pushed forward by one man. I had the honour of showing these Rail-ways to several of my friends, in 1787, at the house of Mr. Foster, who was then Speaker of the House of Commons of Ireland. The advantages proposed by this construction were to extend the use of Rail-ways to temporary purposes, and to reduce the expenses considerably, by dividing into several parts the weight which is usually loaded on one carriage, so that the Rail-way might be reduced in weight and cost, without being more liable to break than those that are in common use.

A number of small Carriages to be used on rail-ways instead of large Carriages.

This plan has since been successfully adopted in many places, particularly at Penrhyn Slate Quarry, where a number of small carriages, loaded lightly, supply the place of one larger Carriage; by these means, iron Rail-ways may be made sufficiently strong, though not one fourth part of the weight or cost of ordinary Rail-ways.

Mr. E's rail-ways to be supported in Bogs on piles driven into Bog.

Portable rail-ways recommended and Estimate of their Expence given, Appendix, No 4.

I propose that these portable Rail-ways, should be supported on piles of five or six feet long, driven into the Bog, and that they should be removed from place to place, so that after a series of Rail-ways had been laid, to the distance of half a mile, for instance; and after the carriage had emptied its loads on each side of it, the Rail-way may be detached, and placed at the distance of two perches, parallel to its former situation; these Rail-ways are described, and an estimate given of their cost in Appendix, No. 4. It will thence appear, that the share per acre of the capital of £. 500, expended on the Rail-ways and Carriages, would, on 1,200 acres, amount to about five shillings per acre; wear and tear about three shillings more; spreading, gravelling, and removing machines, about ten shillings. This estimate is made on the supposition that the Machines and Rail-ways would last four or five years, the time necessary for completing the improvement of 1,200 acres, so as to make the land worth 30 shillings per acre; the expense of the whole per acre would be nearly as follows:

Expense of reclaiming a Bog by putting out Clay with portable rail-ways for one acre.

	£.	s.	d.
Wear and tear, and share of capital, per acre - - -	—	8	—
Draining - - - - - - - - - - - - - -	—	10	—
Turning up surface - - - - - - - - - - - - -	2	13	—
Digging and filling Clay, &c. - - - - - - - - -	2	13	—
Carrying out Clay on movable Rail-ways - - - -	1	14	—
Spreading Clay and shifting the Rail-way - - - -	—	10	—
Damages for Gravel-pit - - - - - - - - - - -	—	7	—
Irish	£. 8	15	—

(Equal to £. 5. English per English acre).

Estimate of ditto for whole district, No. 7.

To improve the Bogs of the whole District, viz. 21,367 Irish acres, would, according to this estimate, cost £. 181,619 Irish, equal to £. 167,648 English, for 34,569 English acres; thus a permanent income of nearly Thirty thousand Pounds English could be obtained at less than six years purchase.

Value of Bog improved by putting out Clay.

I consider the plan that is here recommended as the first stage of improvement; and I believe that it would make the Bog worth Five and Twenty and Thirty Shillings per acre.

Reclaimed Bog may be further improved at small expense.

Substantial and intelligent Farmers would for half as much more double its value; poor Tenants, if they are allowed to have more than a Garden, and as much Land as will support a Cow, with grass and hay, would soon wear out what had been done. Reclaimed Bog must be continually attended to; and if red Ashes are to be found below the surface, and Lime in any form be within reach, the Bog may be made worth Four Pounds per acre.

The above estimate may appear too low.

Estimates generally fall short.

I have stated, that the first stage of improvement of a Bog, which is in fact by far the most difficult of any other, may be accomplished for £. 8. 15 Irish per Irish acre, equal to £. 5 English per English acre; I am well aware that this appears to be a very low charge, and not unlike those estimates which sanguine or interested Engineers hold out to induce the Public to pursue some favourite scheme of the Projector: But what is here laid down is taken from the common prices of work, and from repeated experience of the machinery that is to be employed. Wherever I have been consulted as an Engineer I have never been unwilling to undertake the work in question, according to my own estimate, with a reasonable addition to cover accidents, and to give an adequate compensation for my trouble, and for the interest of the money which must be advanced. I should therefore stipulate for one third more than my estimate were I to undertake the improvement of any considerable quantity of Bog.

To those who are conversant with large undertakings this will appear no unreasonable security against the losses and disappointments that never fail to occur in carrying on the best concerted projects. Few great Buildings, Docks, Fortifications, or Canals, are executed for less than double the original estimate.

Something new or unforeseen happens, some alteration of the plan, or deficiency of the materials, is discovered; and when the work has advanced for some time it is found better to complete it at an increased expense than to abandon it altogether.

As

Offer to improve a thousand acres of Bog.

As I never was more thoroughly convinced of the feasibility of any project than of that upon which I now offer my opinion, I hold myself ready to undertake the reclaiming One thousand Irish acres of a Bog of middling quality; that is to say, between what is most easy, and what is most difficult in this District, for Eleven thousand six hundred Pounds Irish, which is one third more than the amount of the foregoing estimate; at the same rate 1,000 English acres would cost £.7,800 English; if a considerable number of acres of Bog were thus undertaken by persons who could give good security for the performance of their contracts, the improvement of the Bogs of Ireland would of course gradually follow.

Planting Bogs.

Many Bogs after they have been drained to a certain degree are capable of being planted without any farther care than to dig up and break the surface round each plant; wherever water settles after the trees are planted it must of course be drawn off. One of the surest indications of the fitness of any Bog for a plantation is the flourishing appearance of the plants already growing in or near the Bog. At No. 5, the growth of Bog-myrtle, and of some trees that had been planted on the borders of the Bog, made me point it out in Appendix No. 5, as a proper place for an experiment upon planting Bog without first claying and breaking it up. Among the young trees that I saw thriving on this Bog I was surprised to find some vigorous Larch; I have since seen in Bogs, in the Queen's County, other instances of thriving Larch.

Larch thrives on Bogs.

Inland plantation may be carried too far.

In planting Bog, attention should be paid to the probability of a demand for the timber. Near the coast all kinds, and any quantity, of timber may be advantageously disposed of; in this District nothing but oak, ash and fir would be profitable.

Trials of the soil should be made previously to planting.

It appears to me that Bogs apparently alike are not always equally proper for the same kinds of trees, it would therefore be prudent to make previous trials before the large plantations should be undertaken. Most Bogs may be prepared for trees by culture; I should therefore recommend that plantations for shelter and ornament should be made on every Bog that is improved; a judicious assortment of timber trees on those Bogs would not only be profitable, but would entirely change the face of the country. If large plantations were made they should be toward the middle of the Bogs, lest they should prevent that free current of air that is necessary to keep the ground sufficiently dry. One advantage attends the plantation of Bog, that is not to be met with elsewhere:

Planting Bogs might change the face of the country.

The Drains that are necessary in a Bog may be so disposed as to form inclosures for trees without any additional expense. It will not be difficult for a person of taste, who is at the same time a skilful planter, to lay out Bogs so as to become highly ornamental, without producing more shelter than is wanting:

In the choice of trees, experience alone should be the guide; in some Bogs, as in some soils, one species of tree will not grow, whilst another flourishes in full vigour. I have seen oak flourish well, where ash was wretchedly stunted: Perhaps oak may succeed in shallow Bogs when the plant has strength enough to force its roots downward through eight or ten feet of Bog to solid earth below. I do not however recollect to have seen oak growing far from the edges of a Bog; and I have been told, by a gentleman of observation, that the roots of no trees can live in the lower part of deep Bogs. My own experience on this subject is but limited. I have seen large and strong Scotch fir in deep Bogs, and some good alder. Aquatic trees, it is said, have the property of drying wet ground, where they have taken root; if this be the case they might be employed as *preparatory crops*. Timber sally, or salix viminalis, is commonly found in Bogs; whether it will thrive in them in their present state I do not know; but I have reason to believe that common osiers do not grow well in such soil.

Planting Bogs with suitable trees.

Other purposes to which reclaimed Bog may be applied.

The other purposes to which reclaimed Bog may be applied are so various, and so much the same as those for which other land may be used, that it is not necessary in the present stage of the business to enter into any minute detail upon the subject. The rich will at first plant ruta-baga, and hemp; the poor, potatoes and flax. And according to the views of the Legislature to encourage the poor to cultivate hemp, the most certain method is to engage for the purchase, at a fixed price, for all hemp raised within a given time. Let the price be liberal, and payable at the principal Towns in the neighbourhood, without affidavits or certificates. Some slight frauds may be attempted; but encouragement for perjury will be thus avoided; and even the few attempts to deceive, that may be practised in the beginning, will be discouraged by the fair-dealer. The peasant from his own experience, by taking into account the loss of time, and credit, will by degrees learn to conduct himself more wisely and more honestly.

Means of encouraging the growth of Hemp.

Bogs well treated amply repay the Cost of Improvement.

The more remote employment of reclaimed Bog should not be unnoticed; it is a common belief that after some time it returns to its former state. This opinion I have heard most frequently from persons who were at the time feeding cattle upon reclaimed Bog; these unconscionable people, after taking two crops of Potatoes, and two of Oats, from the new land, sowed it with coarse Grass-Seed; mowed it till it no longer yielded meadow; and then complained that it was throwing money away to improve Bog.

Reclaimed Bog, like other Land, must be refreshed with Manure.

In most of the cases that I have examined I have found that the capital laid out has been accurately remembered, but that the returns made by the first crops were forgotten, so that only the present produce of the worn-out soil was considered as the return for the original expense of improvement. Had continual additions of limestone gravel and clay been made to the soil the expense would have been amply repaid, and the soil would at length have become permanently profitable.

Improvements of Bog compared with Improvements of Land of the best quality.

I have also heard it asserted, that Ten Pounds per acre laid out upon the best land in Ireland would yield more profit than if laid out upon an acre of Bog, or other unreclaimed land; this is one of those vague assertions which are made without any foundation in experience, but merely to supply the want of something better to say. If this were the case, why should bills for the inclosure of commons pass every year in England?—Why should not the boundless capital of British Merchants raise the value of land near the metropolis, ten-fold every year?—It is true that every acre of ground near London might be converted into a dunghill; but though a dunghill and a hot bed are the most productive soils for Asparagus and Cabbage, could the Butter of Ireland, or the Cheese of England be produced by Cows fed on dunghills?—The garden culture of Battersea and Brompton is carried to the highest perfection, and it is profitable; but not to such a degree as to invite that species of competition which always follows high profits.

Scheme of improving Bogs propoſed by the Dutch.

The scheme of improving the Bogs of Ireland is by no means new. The Dutch, in the time of King William, offered, upon condition of being governed by their own laws, to form a colony in the Queen's County, and to make meadow of the whole Bog of Allan.—(*v.* Philosophical Survey of the South of Ireland, page 126.)—In fact, the experience of ages teaches what Bacon has told us, that great gains are to be made by parsimony or by new inventions.

It is not surprising that the project of improving Irish Bogs should have occurred at different periods, both to individuals who had only their own profit in view, and to the patriots who are zealous for the prosperity of their country.

Reclaimed Bog peculiarly suited to Irish husbandry.

Undoubtedly it is an object of the highest importance to the State, and particularly to this portion of the empire, because the modes of life are such in Ireland as would immediately be suited to the cultivation of the kind of soil which may be obtained by the first stage of improvement in Bogs. Much of the cultivation among the great mass of the people in Ireland is carried on by the labour of men without the plough; the tender soil of newly-reclaimed Bog might not for some time bear the tread of cattle, though it might be manufactured by the spade and shovel; and a time will come when many thousand hardy Irishmen must return from the Army and Navy to their own country; where to find employment of any sort will not be very easy, and where the wages of ordinary labour are much lower than a soldier's pay; but in the cultivation of land, fit for the immediate production of the common food of the country, they would find a resource against idleness; as they would, if they were assisted by the gift of some timber from the Proprietors of the Bogs, soon build themselves habitations, and would thus have a reasonable hope of being able to support families. Independently of this more remote speculation we see that in this part of the country the population increases rapidly, and that the fathers of families, when their sons grow up, are obliged to divide their small farms among their children, a system, as Lord Selkirk has shown, in his excellent Essay on Emigration, to be the most destructive of happiness that can be followed in an agricultural country, where there is no means of adding to the quantity of profitable land.

Survey of the Bogs in itself advantageous to Ireland.

Experiments should be tried of the best method of improving Bog in every District.

At all events the surveys that have been made will be useful.

But even if the means proposed for bringing our Bogs to this state of cultivation should not ultimately succeed, yet our labours have not been in vain; to have surveyed our Bogs; to have acquired the most exact knowledge of the levels of their surface; of the depth and consistency of the soil which lies beneath them; of the direction and fall of the Streams and Rivers which intersect them, and which may carry off their superfluous water to the sea, is undoubtedly advantageous to the country, as it enables us to determine, either, that to reclaim our Bogs is impracticable, and a project too expensive; or, on the contrary, that there are well-founded hopes of success. Further, to enable the Nation to decide whether this project be a vain speculation and a job, or a useful feasible plan, let an hundred Acres of Bog be procured, by rent or purchase, in every District which has been surveyed under the Orders of your Board; and let such Plans as your Board approves be fairly put in practice, under the inspection of Engineers of your appointment; let the expense be limited within a certain sum per acre, and the result will be before the Public. If it be unfavourable to the scheme, it will at all events be allowed, that the Surveys made under the orders of the Board are valuable materials for a Topography of Ireland; that the inquiry will have raised a spirit of research, and habits of accuracy, that were unknown on such subjects in this part of the United Empire; and that it has introduced into the country a considerable number of excellent instruments, which will oblige Surveyors hereafter to study the construction of Mathematical Instruments, and to be ashamed of such tools as were formerly in use.

I have seen a Surveyor of extensive practice employ a circumferentor, the sights of which were tied on with pack-thread; and another, with *an iron nut and screw*, to one of the legs of his instrument, within an inch of the needle!

Consequence of successful experiments

Instead of the miserable scrawls which were given in as Maps of Gentlemens estates, none but distinct and exact surveys will now be tolerated. If this improvement in the professional habits of numbers of men of understanding, which had been previously cultivated by a certain degree of science, be not in itself a great advantage, there is no faith in the experience of the past, nor any trust in the hope, that as men become enlightened they become better citizens.

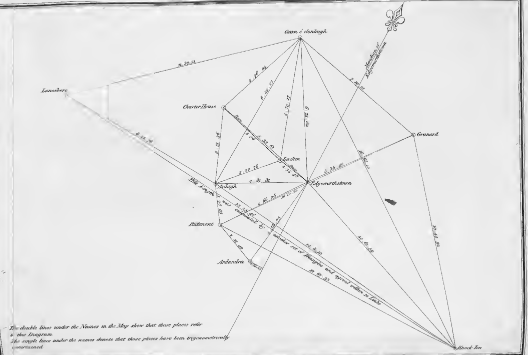
Capital might be advanced upon good security.

But if these Plans and these experiments succeed, the benefit will be instantly perceived, and permanently felt; no person possessed of Bog can fail to wish for its improvement; and all that can then be wanting would be Capital. This might perhaps be safely advanced upon landed security, to landed proprietors, and at such times, and by such degrees, as would leave but little probability of loss, or temptation to fraud. But without the assistance of Government, if we succeed even upon a small scale, British capital will soon be found ready to carry

on

787 .

Plate XIV_Appendix N°6_SECOND REPORT FROM THE COMMISSIONERS, ON THE BOGS OF IRELAND_1811.



The double lines under the Names in the Map shew that those places refer to this Diagram.
The single lines under the names denote that those places have been trigonometrically ascertained.

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J. Basire sculp.

All proprietors would imitate successful improvements.

on such profitable work to a large extent. Those who are tremblingly alive to every interference with their property, even with those parts of it which yield them nothing at present, and give no hope of ever yielding any thing, would embrace eagerly a proposal that should leave this darling property untouched by any hand but their own, and which should hold out to them a certain prospect of gain.

The improvement of Irish Bogs has been a favourite object with every true patriot who has written on the affairs of Ireland. There is, in particular, an excellent Essay, written near 150 years ago, upon this subject, in the "Philosophical Transactions," (Lowthorp's Abridgment, Vol. 2. page 732.) in which there is the following passage:

"An Act of Parliament should be made that they who did not, at such a time, make some "progress in Draining their Bogs, should part with them to others that would."

This is strict justice in every nation upon earth. No man, from prescription or from any grant, has a right to monopolize and withhold the soil from cultivation. Could the proprietors of the Coal-mines and Salt-pits in England be permitted to combine and shut them all up? Or could the owners of all the Bogs in Ireland lawfully combine to prevent them from being cut for Turbary?

Fortunately for Society such extreme cases do not often occur. Motives of interest in time overcome the caprice of pride; and when mankind clearly perceive private advantage and general utility in any national undertaking, the narrow prejudices of a few are soon despised and overborne; and those who had been most clamorous in their resistance become the most vehement partizans of the very project which they had formerly opposed.

28th October, 1810. RICHARD LOVELL EDGEWORTH.

APPENDIX to Mr. EDGEWORTH's REPORT.

No. 1.

NOTES on the CONSTRUCTION of the MAP of DISTRICT, No. 7.

Appendix to Mr. Edgeworth's Report on District No. 7.

ACCORDING to the Instructions of the Board, (§ 28 of the Instructions,) it was necessary to establish permanent means of verifying the Maps delivered to them by their Engineers, so that they might hereafter, if thought expedient, be connected with each other, for this purpose, with the assistance of Mr. William Edgeworth, I selected a straight and level road between Edgeworthstown and Longford, as a base for the first Triangle of a Trigonometrical Survey; there are several roads of sufficient length, straightness, and level in this District, for bases of such a primary Triangle, but this was preferred on account of its having been the base which Major Taylor made use of Twenty-five years ago, in his intended Survey of the County of Longford; and more especially because of its vicinity to a meridian line which has been drawn through the Towns of the Church of Edgeworthstown.

This meridian has been laid out with great care by Mr. William Edgeworth, under the personal directions of Dr. Brinkley, Professor of Astronomy in the University of Dublin, with an excellent transit Instrument of two feet radius, which was the gift of the late learned and benevolent Bishop of Elphin.

At the same time that I determined a meridian line in this District; I also had the latitude ascertained by a mean of Twenty-five Observations of the Pole Star, these were taken by Mr. W. Edgeworth, with an excellent circle of 16 inches diameter, made by Troughton, which Major Taylor had the liberality to trust to his care. After all proper allowances were made for refraction, precession, abberation, proper motion, and mutation, the latitude of the Tower of Edgeworthstown Church was determined to be 53°. 41′. 46″.

I had hoped to have also given the longitude of this place exactly, with the assistance of Dr. Brinkley, but the weather has suspended our operations; whenever they are completed the result shall be communicated to the Board. The longitude is in the mean time given from Dr. Beaufort's Map of Ireland 7°. 30′. 40″.

I beg leave to observe, that the time employed upon these subjects has not been charged to the account of the Board.

The base of the Map was repeatedly measured from the Charter-house near Longford, to the bye-road to Mr. Mills' House at Lackan, a distance of 3 Irish miles, 58 chains, and 38 links. This prolongation was necessary, because the road at Mr. Mills' makes a small angle, viz. of 4°. 8′. 0″. and because the Elevation of the Tower made it a conspicuous object from different parts of the District, and lastly, because the base is here connected with the Meridian.

The meridian was determined by a great number of observations of the Pole Star, and of Stars near the Equator, so as to leave little doubt of its truth, within five seconds of a degree, so that if this Meridian Line were continued from sea to sea it would not differ more than Twenty feet from the truth.

The steadiness of the Instrument was ascertained, from time to time, by a mark established at Four miles from the Observatory, leaving no uncertainty as to this material point.

From the extremities of this primary base two great Triangles were measured repeatedly,

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with a large Theodolite of Troughton's make, to ten seconds of a degree, to the hill of Ardagh and Cairne-y-Clonhugh, and another Triangle from the Tower of Edgeworthstown and the Charter-house, to the Hill of Ardagh or Slieve-gauldry. Thus new bases were determined on the different sides of these Triangles, which enabled us to form a series of Triangles through the whole District, determining accurately the situation of upwards of Sixty places, and extending the trigonometrical measurement to the extremity of the District at Anna, Lanesborough, and Tarmonbarry, on the Shannon; Granard on the Camlin Finea, and Camma-bridge and the Float, and Ballynalack on the Inny; and taking in Knock Jon, and Carneyclonhugh, the Hill at Richmond, at Ferrifad; the Castles of Enyer and Ardandra, and other points which may be seen at a great distance in neighbouring Districts, and may thus connect the Surveys that may be made of them with that which we now offer to the Board.

The accuracy with which these angles and measures were taken far exceeds that with which they can be laid down on paper; it can however be expressed by numbers, and for that purpose. on the upper corner of the Map, towards the left hand in Map No. 1, a Diagram of the principal distances determined by our Survey is delineated, with the length of the sides of the Triangles, in miles, chains and links, in figures; by means of this Diagram the Map itself may be examined, as to its accuracy, and by the same means its principal points may be laid down by any larger or smaller scale at pleasure; and, wherever actual observation has obliged me to differ from the Maps, which were to be copied into ours, those differences may be ascertained, and where we have erred the error may be detected.

Our Maps in some places appear less filled than in others, this arises from the nature of the object for which the Map was made: it was made principally for the purpose of giving a view of the relative situation of the Bogs in this District, and of their respective contents; now it happened that Mr. Taylor's and Mr. Larkin's Maps had already described the country near the principal Bogs, so that in copying these Maps it was but little additional trouble to insert what they contained; but in the middle of the Map it would have been much additional labour to fill it with particulars which have no immediate connection with the object committed to my charge, Slieve-gauldry, Richmond, Terrifad, Lisnannagh, Cairneyclonhugh Moat, Ferral, &c. have been inserted, because they were points to and from which angles had been taken to connect the distant parts of the Survey.

In carrying on the survey we were assisted by the Gentlemen of the country, in every way which we could desire; on the principal heights permanent mounds were raised for us, as objects to mark the precise points where angles were taken, and as these mounds remain, they may for some time serve for connecting our Survey with others.

Where it was necessary to determine the situations of places that were at a considerable distance from each other, and that were on low ground, I found it very useful to employ portable Skreens, that could from their size, and colour, and figure, be easily distinguished from other objects; the figure that I found to be the most distinct was an Isosceles Triangle, whose sides were about three times the length of its base; one side of it was black and the other white; when it was to be looked for in a valley the white side was presented; it consisted of two poles of deal, sixteen or seventeen feet high, turning on a small bolt at top, so that the poles, when drawn asunder at bottom, and placed on the ground, the Machine stood in the form of the letter V inverted. It could be easily traced by cords and by tent-pegs, one before and the other behind; a cover half black and half white was thrown over it, so that it could be easily put up and taken down, and as it folded up it was commodiously portable.

On hills, to which I had often occasion to recur, I had decayed Fir-trees planted, with their branches pulled off, except a few at top which distinguished them from other trees, I found this also very useful.

Four Maps, One page of Drawings of Machines, and large Rolls of Sections, amounting to 90 miles in length, which have been drawn according to the directions contained in your second paper of Instructions accompanying this Report.

The Map No. 1, which is the largest of the four, is laid down according to your Instructions, (Sec. 12.) by a scale of Four inches to a Mile; the boundary of the District is distinctly shown on this Map; it is bounded on the north by the road from Finca to Granard, and from thence by the River Camlin, through Longford to Tarmonbarry on the Shannon; on the west it is bounded by the Shannon and by Lough Ree; on the south by the River Inny to Ballynalack, and from thence on the south-east, by the road by Benbrusna, by Wilson's Hospital, and Stone-Hall, and on the east over Knock-Jon, through Castle-pollard and Carlinstown, to the Bridge of Finca.

This Map has the true Meridian-line traced through it parallel to its sides, having been in great forwardness before the second paper of Instructions from your Board reached us.

The second Map is a copy of the former, upon the reduced scale of Two inches to a Mile, in pursuance of your second paper of Instructions; and in obedience to those Instructions the Magnetic Meridian is placed parallel to the sides of the Map; lines are drawn on the Map to show where the Engraver is to divide the Plates. The difference between the true Meridian and the Magnetic Meridian at Edgeworthstown, November 12th 1810, was 28°. 17'. 0", this is also very near the mean of a number of experiments; the Needle however at present varies much; as for instance,

November 1st - - - - - - - 28°. 14'.
November 6th - - - - - - 28°. 22'.
November 10th - - - - - - 28°. 14'.

So that from the 6th to the 10th there was a variation of Eight minutes; the whole of this variation might have taken place instantaneously, at any moment of these four days. The observations for the purpose of determining the variation of the Magnetic Needle were taken by Mr. William Edgeworth, with an excellent instrument made by Mr. Troughton; it is furnished with a Vernier and Microscope, by which Minutes of Degrees may be read off.

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Map No. 3, is a separate delineation of the Bogs on the Inny, and of some scattered Bogs at a small distance from those immediately bordering on that River.

No. 4, is a Map of the Bogs near the Shannon. These two Maps have been constructed to give a clear knowledge of the levels and depths of these Bogs. In taking the levels and depths of these Bogs, and in boring them in different stations, the stations themselves were actually marked on the Bogs by letters and figures. These stations are transferred to the Maps by figures corresponding with those on the Bogs. These figures refer not only to the Bogs themselves, but also to the annexed tables.

The figures denoting these references are placed over dots, which represent the stations. The black figures on the left side of the dots show the level above a point in Lough-derevereagh where the Inny Bogs end. The red figures on the right side of the dots show the depth of the Bog from its surface to the gravel or rock at bottom. Beside these indications, the Maps are shaded in such a manner as to point out the ridges or highest parts of each Bog. In the tables annexed, these levels, and the depth of the Bogs, are laid down alphabetically, so as to be easily found in them or on the Maps. There are beside columns showing the depth of the soil between the bottom of the Bog and the hard sub-stratum, and another column denotes the nature of the soil.

The large Map was at first intended as a rough copy to be fairly drawn for your Board, but from your second paper of Instructions it appeared to me superfluous to put the Board to the expense of such a Copy, however it might be creditable to me; a beautiful Map, like every thing else that is beautiful, recommends itself by its appearance; but to your Board, what is useful and accurate for the ultimate purposes of improving the Bogs of Ireland will be acceptable without this ornamental recommendation. I venture thus to apologize on the part of Mr. William Edgeworth for his want of practice in the manual elegance of his business. No apology should be offered or could be accepted on account of his youth, or upon any other account for any deficiency in the execution of the survey itself, or for any material errors in the levelling or boring of the Bogs and Rivers. This part of the business I have rigorously superintended, and can safely vouch for their accuracy. I am satisfied that the levels in the Inny Bogs were taken with uncommon accuracy. The north and south lines were intersected, and proved by those that run from east to west, according to Sec. 14 of your Instructions, and with this trial they were found to agree with each other within one inch in a mile. In the Shannon Bogs, the levels from increased practice were taken with still greater accuracy, so that in levelling circuitously through the Bogs, from the north to the south, a length of ten miles, the result agreed with the level of the water of Lough Ree within five inches.

Some errors should be excepted in the work of one of my Surveyors in the Survey of the Inny Bogs; as they are not material, I forebore to have them corrected by a new Survey.

The large Map is the joint drawing of Mr. William Edgeworth, and of Mr. Hampton, a young gentleman of uncommon industry and exemplary conduct.

The reduced Map, No. 2, was drawn by Mr. William Edgeworth, except part of the writing, which was done by Mr. Hampton.

No. 2.

MACHINE for loading and unloading BOATS.

TO facilitate the loading and unloading of Boats on Canals I should recommend a Machine, which I employed in 1772, in the works which I then carried on upon the Rhone. It was used with great advantage in transporting earth from one side of the Rhone, to fill up expeditiously an outlet of that River, so as to force the current into a new channel.

An upright (U), was raised on each side of the Boat (B). These uprights were braced on each side at (*b b*) to keep them steady. Upon these uprights was placed a long and strong axle-tree, upon which the table or body of a cart turned, so as to empty its contents over the side of the Boat. This table was supported by props on one side, and held in its place by the chain (C).

The ground on the bank of the River was very low, being flooded in winter; it was not therefore possible to load this Machine merely by the shovel; besides time would have been lost whilst the Boat crossed the River. I therefore constructed a kind of subsidiary cart, raised upon piles, as a receptacle (R), which was filled by men with baskets, which they carried on their heads from the pits, where the earth was dug.

By means of the wide gang-way (G) which was supported by the piles, and by a trissel (S) loaded with sand, they had easy access to the receptacle or cart (R), the numbers of these men were so calculated that they could just fill the receptable (R), whilst the Boat was passing and re-passing the River; and the moment that the Boat had returned to the shore the load was poured into it without delay from the receptacle.

Where the land from which the clay is to be taken is on the side of a hill, advantage might be made of this machinery, which upon trial on a very extensive scale was found to succeed in accomplishing its purpose.

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Where the height of the gravel-pit does not make it necessary, the upper cart and the gang-way may be omitted; in many places the cart or table raised on the Boat will save time and labour.

No. 3.

Description of a MACHINE for taking Sections of a RIVER.

PLATE 1. Figure (2), is a perspective view of the Machine. The drum (D) covered with paper, is turned slowly round by the intervention of perpetual screws and wheels, (W) (W) which receive their motion from a spiral wheel (H), that lies under the surface of the stream.

As the whole Machine which floats on the water by means of the two hollow cylinders of tin (C. C.) is drawn after a Boat, the spiral wheel is made to turn by the resistance of the water; whilst the drum is moving round, the long tail (T) is lifted up by every inequality of the bottom of the River, and as it rises up and down, it moves an arm which is hinged at *(h)* to the frame of the Machine, this arm pushes backward and forward a rod (R) that holds a pencil (P), the point of which marks the motion of the tail upon the paper. The tail bas also a motion sideways on pivots (P P), which permits it to move in curved lines where it is necessary. (H) is the spiral wheel turning under water. (S), a perpetual screw turning a wheel. (S), another perpetual screw on the axis of the wheel which turns the wheel (W), which being fastened on the axis of the drum (D) turns it round under tbe pencil (P). Each of the wheels (W W) having sixty teeth, the spiral makes 3,600 turns, while the drum makes but one.

The tail (T) is a hollow tube of tin, which fills with water, and becomes sufficiently heavy to sink, but when lifted out of the water, it is light and easily portable, because the water falls out of it.

The manner in which the tail moves the arm (A) and the rod (R) which are connected at 1 and 2 by hinges, is sufficiently obvious from inspection. This motion, by means of hinges, is wonderfully steady. It is used in the common instruments for dividing clock-work, and it was used by Ramsden, and is used by Troughton for dividing Mathematical Instruments.

The drum turns round nearly once in every two miles, and the pencil moves in a space nearly equal to one eighth of the space through which the tail moves when it moves up and down. The scale at the bottom of the plate shows the measure of the different parts of the Machine with sufficient accuracy. The paper is fastened on the drum by a ruler of wood, which by means of the screw (N) presses the paper against a part of the drum which is made rough by being punched outwards with a sharp punch so as to have small protuberances like a nutmeg-grater.

It is not necessary that the Drum should go round exactly in two miles, or with any other fixed velocity, nor that the short arm and the tail should bear any given proportion to each other; provided that the length of the short arm (A) is any aliquot part of the length of the tail, it will be easy to reduce the Section delineated on the paper to any requisite scale.

It is obvious, that the distances measured by the spiral wheel must be different, when the machine goes with or against the stream: but if the river is measured backward and forward, the mean between these measures will be very near the truth; but for an exact Survey a map should be previously made of the River, and the principal reaches of the River; or any other remarkable objects should be marked on the banks of the River, by stakes or hillocks, and they should be noted correspondently on the Map, as the machine proceeds, so that any errors that might occur in the measurement by the spiral wheel could never accumulate, because they could occur only between one fixed point and another on the banks; and as these points are transferred to the paper they must be accurate notices of the places observed by the person who conducts the machine.

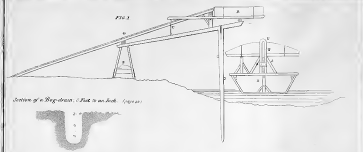
The steadiness with which this machine floats, and the accuracy of its performance, gave me great satisfaction. Were I to wish for any alteration, it should be in the numbers of the wheel-work, which I would make lower, to permit the drum to turn faster: and I might also wish to alter the relative proportions of the arm and the tail, which I would make such as to mark shorter lines upon paper.

The Sections accompanying the Maps belonging to this Report were taken in a very short time, and with great facility. The country people, from the easy motion of the Machine on the water, and from its size and shining appearance, gave it the name of the Swan. The Boatmen, with an epithet taken from its use, called it the Learned Swan.

	Feet	Inches.
The Fall from Lough Kinnail to Camma, four miles, is only - -	0	2½
The Fall from Camma, to Lough Derevereagh, four miles and a half -	4	4½
The Fall from Lough Derevereagh to Newcastle, sixteen miles and a quarter	32	3¾
The Fall from Newcastle to Ballymahon, one mile and one quarter -	27	2
The Fall from Ballymahon to the Shannon, four miles - -	26	9¾
Total Fall from Lough Kinnail to the Shannon, thirty miles - -	90	10½

It is not proper to trouble the Board at present with a detail of all the intermediate stations between these places. If any future operations are carried on upon the Inny these levels will be forth-coming; but it must be observed, that even then, except to a practical Engineer,

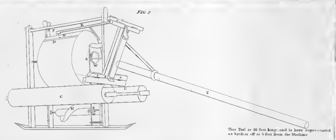
FIG. 1



Section of a Bog-drain; 8 Feet to an Inch. (page 22)

MACHINE FOR LOADING & UNLOADING BOATS WITH EARTH. *(page 283)*

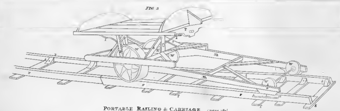
FIG 2



This Tail is 16 feet long, and is here represented as broken off at 5 feet from the Machine

MACHINE FOR SOUNDING RIVERS *(page 286)*

FIG 3



PORTABLE RAILING & CARRIAGE. *(page 287)*

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Description of a MACHINE for taking Sections of a RIVER.

PLATE 1. Figure (2), is a perspective view of the Machine. The drum (D) covered with paper, is turned slowly round by the intervention of perpetual screws and wheels, (W) (W) which receive their motion from a spiral wheel (H), that lies under the surface of the stream.

As the whole Machine which floats on the water by means of the two hollow cylinders of tin (C. C.) is drawn after a Boat, the spiral wheel is made to turn by the resistance of the water; whilst the drum is moving round, the long tail (T) is lifted up by every inequality of the bottom of the River, and as it rises up and down, it moves an arm which is hinged at *(h)* to the frame of the Machine, this arm pushes backward and forward a rod (R) that holds a pencil (P), the point of which marks the motion of the tail upon the paper. The tail has also a motion sideways on pivots (P P), which permits it to move in curved lines where it is necessary. (H) is the spiral wheel turning under water. (S), a perpetual screw turning a wheel. (S), another perpetual screw on the axis of the wheel which turns the wheel (W), which being fastened on the axis of the drum (D) turns it round under the pencil (P). Each of the wheels (W W) having sixty teeth, the spiral makes 3,600 turns, while the drum makes but one.

The tail (T) is a hollow tube of tin, which fills with water, and becomes sufficiently heavy to sink, but when lifted out of the water, it is light and easily portable, because the water falls out of it.

The manner in which the tail moves the arm (A) and the rod (R) which are connected at 1 and 2 by hinges, is sufficiently obvious from inspection. This motion, by means of hinges, is wonderfully steady. It is used in the common instruments for dividing clock-work, and it was used by Ramsden, and is used by Troughton for dividing Mathematical Instruments.

The drum turns round nearly once in every two miles, and the pencil moves in a space nearly equal to one eighth of the space through which the tail moves when it moves up and down. The scale at the bottom of the plate shows the measure of the different parts of the Machine with sufficient accuracy. The paper is fastened on the drum by a ruler of wood, which by means of the screw (N) presses the paper against a part of the drum which is made rough by being punched outwards with a sharp punch so as to have small protuberances like a nutmeg-grater.

It is not necessary that the Drum should go round exactly in two miles, or with any other fixed velocity, nor that the short arm and the tail should bear any given proportion to each other; provided that the length of the short arm (A) is any aliquot part of the length of the tail, it will be easy to reduce the Section delineated on the paper to any requisite scale.

It is obvious, that the distances measured by the spiral wheel must be different, when the machine goes with or against the stream: but if the river is measured backward and forward, the mean between these measures will be very near the truth; but for an exact Survey a map should be previously made of the River, and the principal reaches of the River; or any other remarkable objects should be marked on the banks of the River, by stakes or hillocks, and they should be noted correspondently on the Map, as the machine proceeds, so that any errors that might occur in the measurement by the spiral wheel could never accumulate, because they could occur only between one fixed point and another on the banks; and as these points are transferred to the paper they must be accurate notices of the places observed by the person who conducts the machine.

The steadiness with which this machine floats, and the accuracy of its performance, gave me great satisfaction. Were I to wish for any alteration, it should be in the numbers of the wheel-work, which I would make lower, to permit the drum to turn faster: and I might also wish to alter the relative proportions of the arm and the tail, which I would make such as to mark shorter lines upon paper.

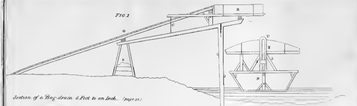
The Sections accompanying the Maps belonging to this Report were taken in a very short time, and with great facility. The country people, from the easy motion of the Machine on the water, and from its size and shining appearance, gave it the name of the Swan. The Boatmen, with an epithet taken from its use, called it the Learned Swan.

	Feet	Inches.
The Fall from Lough Kinnail to Camma, four miles, is only - -	0	2½
The Fall from Camma, to Lough Derevereagh, four miles and a half -	4	4½
The Fall from Lough Derevereagh to Newcastle, sixteen miles and a quarter	32	3¼
The Fall from Newcastle to Ballymahon, one mile and one quarter -	27	2
The Fall from Ballymahon to the Shannon, four miles - -	26	9¾
Total Fall from Lough Kinnail to the Shannon, thirty miles - -	90	10½

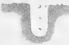
It is not proper to trouble the Board at present with a detail of all the intermediate stations between these places. If any future operations are carried on upon the Inny these levels will be forth-coming; but it must be observed, that even then, except to a practical

Engineer,

FIG 1

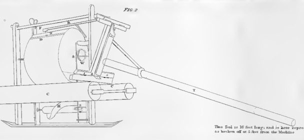


Section of a Bog-drain 8 Feet to an Inch. (page 22)



MACHINE FOR LOADING & UNLOADING BOATS WITH EARTH. (page 183)

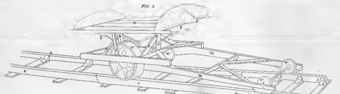
FIG 2



This Tail is 16 feet long; and is here represented as broken off at 5 feet from the Machine

MACHINE FOR SOUNDING RIVERS. (page 186)

FIG 3



PORTABLE RAILING & CARRIAGE. (page 187)

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Ordered by the HOUSE OF COMMONS to be Printed 12th April 1811

Engineer, tney can be of no great service, because the removal of any Weir or obstruction in the River must alter the depth of every shallow in the River above it; so that the removal of Weirs, without proper precautions, may be the cause of shallows, and will add to the obstructions that now exist in the River Inny.

The depth of the slower part of the Inny differs in summer and winter not above eighteen inches; in the more rapid parts it differs in some few places five feet: at a medium, an embankment of two feet high would protect the meadows on the former, and one of four feet high would protect the meadows on the latter; and these embankments, as I have before observed, would serve for Towing-paths.

In a very considerable part of the River no embankment whatever will be necessary.

In the Instructions of the Board their Engineers are directed to ascertain the difference between the levels on their Maps, and the high-water mark in Dublin Bay.

The following Table gives the respective heights above the high-water mark:

	Feet.	Inches.
Royal Canal, at the summit-level - - - - - -	289	10
Inny, at Ballynalack - - - - - - - - -	174	9¼
Inny, at Finia Bridge, or Lough Kinnail - - - - -	181	3
Lough Derevaragh, at R 4 - - - - - - -	195	2
The Inny, at Lough Ion - - - - - - - -	169	10
The Inny, at Ballymahon - - - - - - - -	116	2½
The Inny, at its junction with the Shannon - - - - -	108	10½

Windmills for raising Water.

There are various Machines employed for raising Water by Wind; the Windmill working a common pump by a crank is a good and simple Machine; perhaps it may be more securely mounted than it is at present, by using an open pyramidal frame, to support the Windmill; this Windmill should turn on gudgeons at each end of its axis within side of the frame, and the whole frame should turn round with its base upon a solid circular floor, well fastened to the ground; by the intervention of rollers the frame would turn easily as the wind changed, by its action on a vane fastened to the frame.

Archimedes' screw is the best machine that can be employed for raising Water to a height of eight or ten feet, as for instance, to throw the water of a river upon its banks for the purposes of irrigation.

Beside this application of the screw-pump, to the raising of Water, they may be used effectually for the taking of Marle up from the bottom of rivers.

In the Inny there are places where Marle and Clay are found in beds twenty feet thick over the rock; here a Windmill of the common sort might be erected on a flat-bottomed boat; it might easily be removed from place to place, and Marle might thus be obtained at an easy rate.

No. 4.

Description of a Carriage on moveable Rail-ways.

THESE moveable rail-ways are formed of joists of deal, of any convenient length, from eight to twelve feet long, five inches deep, and two inches broad; I generally cut them to the length of the rafters of any house, that I am building, because they serve very well for roofing after they have been employed some time as rail-ways; they are formed into frames, with two parallel sides, two feet six inches asunder from outside to outside by transverse pieces, made of common deals, bog-oak, or any common timber, about four inches broad, then tranverse pieces are placed about three feet from each other, and they are nailed to the bottom of the parallel joists; they project a little beyond the joists as at (*f f f f f*) to add to the steadiness of the frame by giving it a broader base.

There are also brackets (*b*) (*b*) (*b*) &c. to keep the joists upright and in their places.

To connect each frame with that which follows it, the last transverse-rail or foot of the frame, projects half its breadth beyond the joists at (g,) to serve for the foot of the succeeding frame, so that this foot being common to two frames there is no interruption; where the frames join, where a large quantity of work is to be done, it will be good economy to cover the joints with iron; what is called Kieve-Iron answers well for this purpose; the moveable rail-ways will however do very well without iron; a number of course pieces of refuse timber, eight or ten inches long and five or six broad, and of various thicknesses, will be necessary to be placed underneath the joists to support them in hollow places.

In soft or boggy ground the feet of the rail-ways must be laid upon short piles, proportioned in length and bulk to the hardness or softness of the Bog.

It is to be observed that the rail-ways are subjected to the pressure of the carriages only for a short time, and as the carriages move continually without jolts, and as they are never heavily loaded, the pressure is at no time considerable.

The machines or carts adapted to these moveable rail-ways are constructed as follows: The wooden wheels (W W) are eight inches broad, and two feet high, with an iron axle-tree on which they are made fast. The axle-tree has two gudgeons of steel, turned in a lathe, Appendix to Mr. Edgeworth's Report on District No. 7.

lathe, and upon these, the wooden wheels also are turned; and afterwards they are covered, or shod with iron, so thin as to adapt itself to the circumference of the wheels, without altering the truth of the wheels materially. The frame which contains these wheels is of ash, about four inches and a half deep, and two inches thick. Its length without the shafts *(s h)* which are made separately, is four feet. Upon this frame are erected two upright pieces (U) which are braced at *b b b b*, to keep them steady.

These support a transom or piece (T), to which they are strongly fastened by mortises and tenons. This piece, which projects beyond the frame, and beyond the uprights, is supported where it projects, by iron stays (I I).

This transom, or piece (T), serves for a fixed axle, upon which the body of the cart or table (C) turns, not as the body of a common cart turns, or is emptied, but sideways; and this table is so hung that it may be emptied on either side of the rail-way. There is hinged to each side of this table a leaf, which is let down when the carriage is emptied. Its use is to prevent the Gravel from falling against the rail-way. It is omitted in the drawing, to prevent confusion.

The shafts *(s h)* and their small wheels serve as guides to the Machine, to prevent the principal wheels (W W) from rolling off the rail-ways; the shafts are furnished with two small iron wheels *(w w)* eight inches diameter, which carry but little of the weight of the cart, and also with two small guide-wheels *(w . . . :)* which turn horizontally against the sides of the rail-ways. To prevent these guide-wheels from rising up, and so permitting the small wheels *(w w)* to slip off the rail-way, there is a small ledge (1.) nailed to the side of the rail-way, this ledge projects over the edges of the guide-wheels.

As this method of keeping carriages on rail-ways depends upon principles different from those upon which common rail-way carriages are constructed, I shall explain the difference between them.

The usual carriages that run upon rail-ways have four wheels, each pair of which are fixed upon an axletree that turns with the wheels; as both the wheels on the same axletree are exactly of the same diameter, neither of them would advance beyond the other, unless it were retarded or propelled by some extraneous cause, so that the axletrees and wheels must upon an even surface, such as a rail-way, always advance in a straight line till they are diverted from it by some external cause; and as the wheels are on the sole a little hollow in the middle, their concavity tends to restore them to their proper situation, if they are pushed out of their usual direction.

But still there is a considerable resistance opposed to the righting of the wheels, from the friction of their concave surfaces against the rail-ways, when they cease to move in their proper direction.

A similar cause of friction subsists between the small wheels here described, and their rail-ways, but then the weight that is incumbent upon them is so small as to occasion no inconvenience. The large wheels of my machine are made eight inches broad, to guard against their being thrown off the rail-way by any accident. By this construction the large wheels are kept very steadily in their places; the moment they are disturbed they are brought back to their proper situation by the guides, which hold the ends of the shafts to the sides of the rail-ways, so that however obliquely the large wheels are situate on the rail-way, the guide-wheels tend to force the shafts into a situation parallel to the rail-way, and the large wheels follow their guidance.

This carriage mounted on the rail-way moves with great facility and steadiness. The props (P.) that hold the table up are readily removed, and the load falls without any violent shock. To keep the load whilst it is falling from encumbering the rail-way, a leaf is hung at each side of the table, which is turned down to the ground when the carriage is emptying.

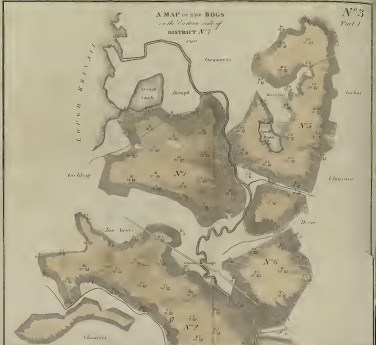
The friction of this machine on the centres of the wheels is inconsiderable, not amounting to more than the four hundredth part of the incumbent weight which is in general about half a ton, the four hundredth part of which is not three pounds. To move the carriage when the rail-way is solid and level requires eight or ten pounds, so that the resistance from rolling amounts to six or seven pounds, but when the wheels are shod with iron, or made of cast iron, and the rail-ways covered with iron, the carriage on a level rail-way moves with more facility.

This however is not intended as a statement of the force actually necessary in common; the force then exerted must, on uneven ground, and from various circumstances, be considerably greater for instance at the boundaries of Bogs; where Bogs suddenly ascend it requires the thirtieth of the incumbent weight, and some times more, to force it up hill; but such sudden slopes are never continued for more than three or four hundred yards, and as the stuff which is to be carried out muſt be raised near these slopes, assistance is at hand from the labourers who dig the stuff.

Nothing remains to be said as to these moveable rail-ways, and the carriages belonging to them, but to explain the manner in which they are removed from one line of carriage to another.

Each frame of the rail-way should be about twelve or fourteen feet long, and about three load should be emptied on each side of each of these frames; as soon as this has been accomplished the carriage passes on to the end of the rail-way, and there it is received by a Tourniquet or frame which turns upon a centre, and conveys the carriage round to a Road, at right angles to its former direction; and in the same manner the carriage turns upon another Tourniquet at the end, so that it comes back to the pit where it was filled. And thus a succession of carriages may be filled and emptied on each side of the rail-way, both going and returning.

When


A MAP OF THE BOGS
in the Eastern side of
DISTRICT No. 7
1810
No. 3
Part 1
LOUGH KENALL
Drough Lough
Drough
No. 5
Lough Rown
Carbar
Clonsara
Drane
No. 1
Cuilderis
New Grove
Lamma Bridge
No. 6
No. 2
Chamers

Appendix to Mr. Edgeworth's Report on District No. 7.

When about one fourth of the ground, at the greatest distance from the pit, has been covered, the rails may be taken up and laid down at the extremity of a new line, and so on through the whole distance; that is to say, when another convenient portion of the rail-way has been used it may be transported to a new line.

It is proposed that one set of frames, half a mile long, should have twenty or more carriages employed upon them, with a proper number of men to load the carts, drive them out, spread the gravel, and remove the rail-ways from place to place.

The operations carried on by this set of workmen would not prevent another set with rail-ways and carriages from working near them; so that any number of men, with proper apparatus, might be employed on one Bog; but for the convenience of procuring labourers, it would be advisable to carry on work in different directions and in different Bogs at the same time. Thus five gangs of workmen might reclaim Five thousand acres of Bog in one year, after the proper machinery had been provided.

The Expense of this Apparatus might be thus stated:

Rail-ways of deal-joist, five inches by two, with kieve hoop iron, One pound Ten Shillings per perch.

A Carriage adapted to ditto - - - - - - - - £.6 — —

Upon these moveable railways I do not pretend to calculate merely from theory but from the experience which I had of their utility several years ago, in conveying a very large quantity of limestone to the distance of three quarters of a mile, for manuring land. They answered my expectations; and were I to have occasion to carry out a large quantity of heavy materials on ground that was not hilly, I should employ them in preference to any other mode of land carriage with which I am acquainted.

I have lately learned that Mr. Roscoe, after various trials of other means, has employed wooden rail-ways and light carriages in improving a peat-moss in Lancashire. The scheme of dividing a heavy load and placing it on several carriages to diminish the pressure on the Road, was laid by me before the Society for the Encouragement of Arts, &c. in 1766.

SETON-PLOUGH.

THE chief difficulty that prevents the cultivation of Bog, is the impossibility of employing cattle of any sort to plough them, or to put out Manure upon them. But there are cases in which tools usually drawn by Horses or Bullocks might on Bogs be drawn by Men.

The Mole-plough is an instrument of this sort; it is a Plough with a conical sock of three inches diameter at the larger end, and sharp at the other extremity; this sock is connected with the Plough-beam by two coulters, which are so long as to permit the sock to run from ten to twenty inches below the surface, while the beam runs near the top of the ground. The coulters cut a passage for themselves, while at the same time they conduct the share, so as to form a cylindrical drain in the earth, which in certain clay soils preserves its shape after the Mole-ploughshare has been withdrawn, and furnishes a permanent passage for water.

I have seen this Plough used with great and lasting advantage in a stiff clay soil, but it is obviously unfit for Bog, the parts of which would fall in and coalesce as soon as the share should be withdrawn; were it not for this the Mole-plough might be drawn by Men to advantage, as it is certainly the cheapest instrument for draining land, that is injured by water lying upon its surface or near it.

But I have made an improvement on this instrument that has adapted it to the drainage of Bogs, even where the soil, if soil it may be called, is so soft as to collapse, wherever a channel of moderate depth has been cut in it.

The sock of this Plough is not more than three inches diameter in its thickest part. An eye or loop is formed at the hinder part, to which a hay, straw, or, what is still more easy to be procured, a rope made of heath, may be attached; this rope is drawn through the channel made by a sock, and when as long a rope as can be drawn forward without breaking has been lodged beneath the surface, the chain to which the rope was fastened must be pulled up, and another piece of rope must be joined to it.

This operation may be performed by Men, at the rate of one half-penny per perch. Of its efficacy in draining Bog I cannot speak from experience; but if pipes formed in this manner were within one yard of each other they would cost little more than Forty shillings per acre.

Other methods of making frequent narrow Drains in Bogs have occurred to me, but I forbear to mention them till I have tried them effectually; Drains of all sorts in Bogs are liable to close, and sometimes to be filled up, by the compression of the superior parts of the Bog, which, as somewhat fluid, press not only downwards but in all directions. To ascertain the effects of this pressure on Bog at different depths I tried the following experiments:

To determine the compressability of Bog at different depths I had one piece cut from the top, another from the middle, and a third from the bottom of the face of a Turf-hole sixteen feet deep; after having cut away some feet of the outside of the bank, each of them were successively pressed in an iron cylinder, five feet high and four feet diameter, placed on an iron plate with holes in it, with some hay placed over it to prevent the Bog-stuff from passing through.

First Experiment:

	lbs.
8 inches of Bog reduced to 3 inches, by - - - - - - -	336
8 inches of Bog taken from middle, to 2 inches by - - - - -	336
8 inches of Bog from the bottom, to 4 inches by - - - - -	700

Appendix to Mr Edgeworth's Report on District No. 7.

Second Experiment:

Eight inches of the upper part of the Bog put into the cylinder, not in the same manner in which it stood in the Bog, but with that part of it put downwards which was before placed laterally in the Bog.

Second Experiment.

	Inches.
8 inches of surface Bog was pressed by 224 pounds for four hours, and reduced to	4
8 inches of Bog taken at 4 feet depth, and pressed with 224 pounds for 4 hours, reduced to - - - - - - - - - - -	3½
8 inches of the Bog taken at 8 feet depth, pressed with only 168 pounds weight, and for the same time, was reduced to - - - - - - -	1½

From the first set of experiments it appears that the middle of the Bog required less force to compress it than the top required; and that the bottom of the Bog, as was to be supposed, required a weight many times greater than what was necessary to compress the middle or the bottom.

From the second set of experiments it appears, that when Bog is pressed sidewise it follows a different law, the bottom then requiring considerably less force to compress it than the top required.

Third Experiment.

	Inches.
8 inches of surface was reduced by the pressure of 224 pounds in a quarter of an hour to - - - - - - - - - - - -	4½
8 inches of middle Bog reduced by the same weight and in the same time to -	5
8 inches of bottom reduced by the same weight and in the same time to - -	1¾

It appears from the third set of experiments that the bottom of the Bog, contrary to the first set of experiments, was by far more compressible than either the middle or the top; this difference is attributable to the greater quantity of water contained in the bottom of the fresh Bog, than what was contained in the upper part; and the total difference between the first and second set of experiments arises from three specimens of Bog, in the former having been reduced to equal dryness, by their having been dug out of the Bog a fortnight before they were used, whereas the latter specimens were all of them very wet, the uppermost, being the driest, sink the least when the water it contains is pressed from it; the lowest stratum sinking the most, from its parting with most water.

No. 5.

Details of particular Bogs.

Derrycrave.

ON the first view of the Map No. (3.) the Bogs on each side of the Inny appear to belong to one great morass lying on the banks of that River. As they are intersected by hills of Gravel, by small Islands, and narrow tracts of green pasture and meadow, and as they are divided either by survey or common usage into different denominations, and belonging to different proprietors, I have considered them separately. To avoid the frequent recurrence of uncouth names I have designated each of them numerically, the numbers of each referring to a table which contains their common names, and the names of the proprietors to whom they are attributed by the persons of the vicinage. This table is contained in (Appendix No. 6.)

Number (1,) of these Bogs lies towards the north of the District reaching to Lough Kinnail, and containing the Lake of Derrah or the lake of the Island. This lake covers about sixty acres of ground, and the Bog near it is very wet and cannot easily be drained.

The Bog soon rises several feet above these lakes, and as it is much used for turbary, this circumstance is but of small consequence as to its improvement.

Advancing towards the middle of this Bog the surface is found to be very wet, having a number of hollows containing water that spreads over it. Some of these hollows are supplied by springs, and some are only the depositories of rain-water. Indeed the wettest places in this district are, with some exceptions, to be met with in the highest parts. Near Newcastle, on the east side of the Inny, towards the middle of the bog, it is remarkably wet and full of holes, in which a man would sink; there are beside long sloughs, one in particular carries off some of the water. In the bottom of these sloughs there are in general tufts of roots matted together, and growing four or five feet deep.

The River Glore runs through No. (5); on the north side of it trees might be profitably planted, as they grow well in its neighbourhood. Quantities of the Mentha Sylvestris grow on the banks of this River, in addition to the common Erica and Myrica, which in general cover the surface of all these Bogs where water does not absolutely lie. In some places we formed beds of Lycopodium Selago, which the people in the neighbourhood called Bog-Shamrock. There are two Drains on the north side of the Glore parallel to that River; but the ground is wet and full of holes; there is a fall midway, and there the Bog becomes pretty firm at (R 6). A stream which carries the water to Loughbown rises at the east edge, and each person who cuts Turf makes a small drain to it to carry

Appendix
to
Mr Edgeworth's
Report on
District No. 7.

carry off the water from his bank. The ashes of the turf here are white. Close to the east side of the lake the Bog is firm and dry. A deep Drain surrounds all the cultivated land at Derrycrave (No. 6); the Bog from (M 6) to (K 6) is particularly fit for planting, being remarkably dry, with a fall; much Bog-Timber has been found here; on the north side young trees and stumps are growing well in this Bog near the Inny on the north side of the Glore.

On the south side of the Glore a Drain seven feet wide has been cut from Clousma Hill to the River, to which it has a good fall. There is also a considerable Drain on this side the River, and parallel to it, which encloses several acres of meadow. The Bog has a gentle slope to the River on both sides, and is so firm that it answers for pasture. The Drains in this Bog should be cut at right angles to the line (17). From (L. 7) this Bog has a gentle fall to the Inny. The turf has white ashes. North of (M. 7) are many cracks and soft places where water lodges, and where grows a quantity of the Myrica, or Rhydiog in Irish.

About the middle of No. (9) there is a hollow, which is like a spring in winter, and it appears that there had been formerly a Drain from thence to the Road, but it is now choked up with course grass. There are several small Drains on the south side, and a wet marsh of 30 or 40 perches long within twenty perches of a Drain.

Towards the S. E. four or five acres have been fenced in to be improved, and many large heaps of roots and heath are collected to be burned. The Drain that incloses the peninsula of Tinode, is nearly half a mile long, six or seven feet wide, and five or six feet deep; it is judiciously laid out, and a long strip of marsh has been considerably drained by it. The Bog to the east rises suddenly above the marsh or curragh, as it is called here, and is separated from it by a choked-up Drain; another long Drain to the west crosses a second firm curragh, which might easily be made into arable land. The whole of the western side of this Bog, No. 9, is flatter, has less heath and more grass than is usual, and was quite dry in June. The turf of this Bog gives in general white ashes, but by digging deeper, turf with brown ashes may be obtained; the land or gravel near this Bog may be easily carried upon it.

In the small Bog, No. 9, which lies nearly parallel to the Dublin Road, several Drains have been judiciously laid out, and a firm stripe of meadow runs through the middle of it, which is drained by a slow but deep stream that goes to the Inny; there is however little appearance of vegetation in the other parts of this Bog, except in the increased size of the heath which flourishes on the very edges of the Drains; a long bank of nine or ten feet wide, which has been formed by the stuff thrown out of one of the Drains, would probably give potatoes, if a small quantity of clay, gravel, or other manure, were laid upon it.

The Bog, No. 8, north-east of Edgeworthstown, is usually called Clonshinnagh, but different parts have acquired the names of the adjoining lands; the whole is uncommonly wet, but is notwithstanding capable of being improved at no great expense. Mr. Croker the owner of the soil has cut some Drains judiciously, and the tenants have done their part by putting out clay and gravel. At (A 10) in the south-west part they have obtained some tolerable meadow and potatoe ground; and the heathy Bog, by the effects of this economy, has become coarse pasture for young cattle, when a few years ago they would have been lost.

Towards the eastern side of this Bog at (D 10,) there are six holes, from six to twenty feet in diameter, which are not springs; but what are here called Swallow-holes, and in England Gully-holes. I examined every neighbouring outlet of the Bog without being able to discover where these reservoirs empty themselves and pour their contents into the Inny. It is obvious that the passage by which they are emptied must bear a proportion not very unequal to the sum of all the little Streams and Drains that fall into them. The little rivulet that runs at the foot of the declivity that borders this Bog on the east is contained in a channel not more than five or six feet wide; in most places it has a hard gravelly bottom, but in parts it flows over Bog. I did not think it worth while at present to examine these parts of the rivulet; perhaps they permit the water of these Swallow-holes to ooze upwards and to be thus carried with the rest of the stream.

This Bog, with all its divisions and parts that are connected together, consists of about eight hundred and sixty acres, of which about fifty or sixty may be considered as appropriate to Turbary, the remainder, though it lies high, is very wet, and is covered with the coarsest kind of plants that grow on Bog.

These Bogs run nearly north and south, declining rapidly southward, except from (A 9,) near the high Road from Edgeworthstown to Granard, where the water descends northward by a stream on the eastern border of the Bog to the Camlin, whence it is carried by that River to the Shannon.

A considerable stream runs with a rapid fall on the western, and another on the eastern boundaries of these Bogs, each of them sufficient to turn Mills in their course, and both of them sufficiently under the level of the Bogs that lie between them, to carry to the Inny whatever water they receive from the Drains on these Bogs.

The general depth of these Bogs is from twenty to thirty feet, as appears by the Sections and the figures on the map.

There is a copious spring at (P. 9,) which supplies the Mill of Ringonny in the driest weather.

About thirty years ago the Proprietor of this Bog cut a small Drain three or four feet wide, and of the same depth, to convey the water of this spring to his mill, the banks of this Drain for the breadth of some yards produce excellent grass. The cattle which in dry weather graze on the edges of the Bog, eagerly devour this sweet and nourishing grass as fast as it is produced; their weight and their heat might, whilst they lie upon these banks, Appendix to Mr Edgeworth's Report on District No. 7.

Ringowny.

consolidate the soil; besides, their dung, as they are in a manner folded upon a narrow spot by the Bog on each side, manures this grass in a most effectual manner.

The heathy pasture upon coarse Bog would often be improved by the neighbouring farmers if they were not in the habit of valuing it far beyond its intrinsic worth. They pay no rent for it, and they are therefore inclined to consider it as clear gain, and they scarcely dare to estimate its advantages after it should have gone through the first stages of its improvement. I consider this Bog as capable of being so far reclaimed, for seven or eight guineas per acre, as to be worth a guinea or thirty shillings per acre yearly; and for two pounds more, which might be saved from the clear profit of the three first years improvement, it might be made worth two guineas per acre upon a long lease.

What renders this Bog so capable of improvement is its being kept marshy, not by the influx of water from a distance, but by springs of its own, of which there are several besides the well. These springs are not concealed, but filled to the brim by water issuing from the gravel beneath them, so that a single main Drain, with a very few inlets and outlets, would draw off the superfluous water from a large tract, at the same time leaving sufficient water to supply the Mill of Ringowny, which derives the greatest part of its water from this source. In its course to the Mill this water might be advantageously employed in irrigating the meadow that may be formed in the Bog in the first stage of its improvement.

The grounds near Ringowny have a sudden fall of ten or twelve feet, to a little stream, that divides this land into two parts, and runs through a meadow that is not more than four or five perches broad. The Bog to the east of these wells is obviously drier than that which is west of them, which clearly shows that they cause the wetness of the western part.

It should be observed, in considering these Bogs as subject to improvement, that they belong to a great number of proprietors, for every person who has land adjoining claims a proportionate share, so that it would be extremely difficult to make these different proprietors coalesce in any general or systematic plan of improvement; nothing, therefore, but an Act of Parliament, upon the plan of an English Bill for inclosing Commons, would reconcile their various pretensions.

No. (10,) a small dry Bog to the south-west of those last considered, has a considerable fall towards Lough Glin; and all the water that oozes out of the Bog is discharged into this lake by a number of small streams.

There are three swallow-holes near (F 11,) and near these holes the Bog, though low, is very dry, with a fall on all sides towards the holes, which is in general the case with all swallow-holes in all Bogs.

The small lake of Glin is very shallow, it receives many streams from the north and west, and empties itself into Lough Iron by a winding rivulet; above fifty acres of this lake might be drained, for there is a fall of five feet from thence to the Inny, and the removing the Mill at Corry would not only effect this drainage, but prevent the overflowing of near two hundred acres of land every winter. The draining these flat grounds would make them worth at least twenty ſhillings an acre more than they pay at present, and is well worth the attention of the proprietors.

Botany island is a small hill of limestone-gravel, entirely surrounded with Bog, and more remarkable for its name than any thing else; one family resides upon it; near it is a little lake, from which there is a chain of springs to the Inny, that never dry, and never freeze, in Bog No. 3.

The Bogs that extend along the western part of this District do not lie close to the Shannon, as those on the east side do along the banks of the Inny; they are separated from the river by a long tract of high, dry, callow land, subject, immediately near the river, to being overflowed in winter, but affording meadow, paſture, and in some places good arable land. The Bogs are all higher than the river, so that there is every where a sufficient fall to carry off the water. At (K 4) it is seventy-eight feet above the level of the Shannon.

No. (12) is surrounded by good land, and by several detached clumps of trees, farm-houses and gentlemens seats. It is dry, with a considerable portion of course grass mixed with tufts of heath. Between Clonard and Gowlan, at (E. 7) there is a considerable tract of wet ground covered with Rhydiog (Myrica Gale) and Bogbean.

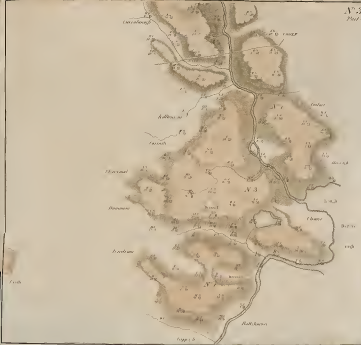
This wet part of the Bog extends southward about eighty perches. A Drain from this slough is laid down on the Map at (Q. 7). To the north of the slough the Bog is more mossy and less heathy, with shorter grass, than in any other part.

No. (13) much drier than the last mentioned, with only small wet parallel sloughs running north and south, the gound more even, more grassy, and it appears more improvable. On the east and south side there is an extensive Turbary, a large tree of Bog-Myrtle (Myrica Gale) flourisbing in the cut-away Bog opposite Captain Montford's.

There is a lake, with firm edges and tolerably firm ground, near (D. 6) close to Rhyn, the intermediate space a shaking treacherous Bog, covered with long grass, that could be improved by draining the lake. It is dry and level at (M. 6), not fifty perches farther it is broken into Punk-hawns like the Bogs near the Inny.

Clonard is a small Island in this Bog, rising gradually to a Road that has cabins on each side of it. There is a narrow stripe of good pasture between the corn ground and the Bog, which would make meadow if inclosed. There is not however any stream in this meadow as might be expected, nor any beyond it towards Napogue. There is limestone in this and in all the other islands of dry ground in the midst of Bog. At the end of the marsh or curragh in (No. 13) it is so wet that an animal cannot stand on it, and

at


No 3
Part 2
Curralanagh
COOLE
Killtean
Coolmore
Corradh
No 1
No 3
Dunmanon
Derreel
Lough
Clonee
Derreel
No 1
Rathmoran
Coppagh

Appendix
to
Mr. Edgeworth's
Report on
District No. 7.

at the farthest extremity are several small swallow-holes, one of them had a soft bottom at six feet deep.

Between Clonard (M. 6) and Ballinakill (K. 6) the Bog is uncommonly level, and it is to be observed, that the parts of this Bog that are the most level are as dry if not drier than the other parts.

The Bog (No. 14) declines from the meadow to a large stream at the south side. There is abundance of limestone near, and one flourishing tree called Lukes Bush, which shows how well planting would succeed here.

There are many Swallow-holes in this, as in all other Bogs, as may be seen in Maps 1, 2, 3, they seem to be caused by the falling in of the Bog into some hollow cavern beneath, this appears distinctly in one instance near Clonfour, where there is a chain of Swallow-holes that seem to communicate with one another for nearly half a mile, with a considerable fall in the Bog from both sides to a kind of open slough, through which passes a stream, that issues from the Swallow-holes and runs someway into the lands of Clonfour, where it falls into three rocky caverns, about twenty feet deep; at the other side of the island the water appears again rising through several rocky holes, one is nearly four perches long and sixteen feet deep, and it is covered by a natural arch of rock. The water in the holes on the west side of Clonfour is only one inch lower than that at the east side of that hill.

The ground is so unstable at this place, that about seven years ago part of a hill fell in and made a considerable hollow. The people in that neighbourhood say that it is all on pillars.

Numbers of young cattle are fed on the dry Bog, at (A. 3.); trees thrive well there also, and a large tract of the Bog appears to be very improvable.

Near Faughan and from thence to the road, the Bog is extremely wet, and that on the west is very flat and covered with heath.

Close to an excellent Turf-bank at Clunkeer, there is a small narrow deep stream that carries off the water from the upland.

The Bog No. 15 is very dry. The surface of all these Bogs should be burnt as the first step to improvement, and the quantity would not be diminished even if they were cultivated to the very Turf-banks.

Ethera is a fertile hill, with a flat Bog at the bottom, the River Onnamount which runs from these marshes, overflows them in winter and wet seasons, good Potatoes are produced in this Bog, which is reclaimed by draining and spreading on it Bog-stuff, which has been thrown up in heaps for a year, and turned several times before it is used, this Manure, which industry may always procure, will bring two crops.

In this part of the county Bog-Drains are called Scunces; and in the Callows, the sharp hard-pointed coarse grass that is common there is called Bagnets, the vulgar name for Bayonets.

It is very difficult to procure good water in these Bog islands. At Ledwithstown, the only place where there is a good spring, the water rose out of the pure marble rock as the foundations of the house were sinking. The marble found at Ledwithstown is handsome, and takes a remarkably good polish; one of the chimney-pieces there is made of it; and I believe there is a specimen in the Museum of the Dublin Society.

Lot's Castle is an ancient building, in a more ruinous state. At one of the dilapidated quoins some of the outside stones are split perpendicularly within an inch of the outside. The land about the Castle is remarkably sweet. The Bog from Clontaffiee to Killashee is particularly dry and improvable, good Oak growing in the neighbourhood of it.

Commissions have been lately held to value Eel-weirs on the Inny, and these valuations are so exorbitant, that it will be cheaper to pass the Eel-weirs by, with Canals cut in the adjoining Bogs, than to purchase these Eel-weirs, especially as such Canals may be easily accommodated with towing-paths, which at the same time will serve to embank the River.

December 3d, 1810.

No. 6.

Table of the Heights of each Station in the Bog 1, above R4.

Letters of Reference in Bog No 1, Map 1 & 3	Height of each Station in the Bog above Lough Derevaragh, at R 4.		Depth of the Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum	Marks cut on the Bogs.
	Feet.	Parts.	F.	I.	F.	I.		
A - - -	14	571	24	8	1	6	Blue Clay -	A
	20	451	19	11	1	6	- - -	B
B - - -	21	591	17	8	0	2	- - -	C
	29	847	21	0	0	1	- - -	D
C - - -	32	537	20	0	0	1	- - -	E
	31	227	29	3	0	8	- - -	F
D - - -	32	727	13	10	0	2	- - -	G
E - - -	4	605	19	5	8	0	Blue Clay -	A
	16	375	24	5	1	6	- - -	B
F - - -	15	049	14	11	0	3	- - -	C
	24	421	21	11	1	0	- - -	D
G - - -	25	747	29	8	1	6	- - -	E
	27	865	34	11	1	6	- - -	F
H - - -	31	615	45	0	1	2	- - -	G
I - - -	32	549	50	0	0	3	- - -	H
K - - -	18	777	8	9	1	0	- - -	A
	27	273	33	1	1	6	- - -	B
L - - -	27	841	25	0	1	2	- - -	C
	27	039	18	9	3	0	- - -	D
M - - -	24	775	26	8	1	6	- - -	E
	28	021	35	0	1	6	- - -	F
N - - -	29	317	35	3	1	4	- - -	G
O - - -	28	459	26	8	1	6	- - -	H
P - - -	15	561	6	9	0	3	- - -	I
	24	491	22	11	3	0	- - -	K
Q - - -	25	121	21	1	1	10	- - -	L
	24	171	20	3	0	2	- - -	M
R - - -	21	921	26	3	1	6	- - -	N
	20	431	24	5	1	6	- - -	O
S - - -	21	981	24	2	1	6	- - -	P
	26	601	39	1	1	3	- - -	Q
T - - -	17	221	41	5	3	6	- - -	R
	21	691	14	0	0	5	- - -	S
U - - -	5	691	8	6	8	0	- - -	T
V - - -	10	813	31	11	7	6	- - -	AF
	16	367	35	5	9	6	- - -	AE
W - - -	26	557	38	1	3	4	- - -	AD
	22	167	42	7	2	4	- - -	AC
X - - -	15	429	35	8	4	3	- - -	AB
	5	649	6	5	2	3	- - -	AA
Bog, No. 2.								
A. 1 - -	35	460	9	2	0	3	Blue Clay -	n.G.n
	37	810	12	5	0	4	- - -	nHn
B. 1 - -	24	430	9	4	0	3	- - -	nIn
C. 1 - -	46	696	11	1	0	6	BlueClay and Sand - -	A m
	47	976	36	3	0	4	- - -	B m
D. 1 - -	43	787	31	7	0	5	- - -	C m
	32	385	20	6	0	6	- - -	D m
E. 1 - -	19	551	16	7	1	0	Blue Sand -	E m
F. 1 - -	32	297	15	6	0	2	- - -	1F1
	37	547	17	10	0	4	- - -	1E1
G. 1 - -	45	317	25	2	1	6	- - -	1D1
H. 1 - -	31	327	4	0	1	2	- - -	1C1
	44	427	33	1	1	6	- - -	1B1
I. 1 - -	31	327	4	0	0	8	- - -	1A1
K. 1 - -	17	437	6	0	0	8	Blue Clay -	E...
	36	508	24	11	0	5	- - -	E...
L. 1 - -	39	072	24	7	0	3	- - -	D...
	37	737	18	5	1	0	- - -	C...
M. 1 - -	33	483	23	10	0	4	- - -	B...
	25	451	21	7	0	3	- - -	A...
N. 1 - -	22	767	21	2	1	6	- - -	$\overline{H}$
	30	647	30	8	0	6	- - -	$\overline{G}$
O. 1 - -	31	777	30	9	1	6	- - -	$\overline{F}$

Letters of Reference in Bog No. 2.	Height of each Station in the Bog above Lough Dereveragh, at R. 4.		Depth of Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bogs.
	Feet.	Parts.	F.	I.	F.	I.		
O. 1 - -	31	737	35	1	1	6	Blue Clay	Ē
P. 1 - -	30	367	21	10	0	7	- - -	D̄
	27	417	24	11	1	0	- - -	C̄
Q. 1 - -	21	147	19	4	0	2	- - -	B̄
R 1 - -	21	644	19	3	0	3	- - -	Ȧ
	23	964	23	2	0	6	- - -	Ḃ
S. 1 - -	26	664	25	6	0	5	- - -	Ċ
	28	484	31	9	0	6	- - -	D
T. 1 - -	28	584	32	1	0	2	- - -	Ė
	28	484	28	11	0	4	- - -	Ḟ
U 1 - -	28	784	21	11	1	2	- - -	Ġ
	21	304	16	6	0	2	- - -	Ḣ
V 1 - -	7	764	4	10	0	3	- - -	İ
	21	414	27	1	1	2	- - -	K̇
W. 1 - -	7	624	13	3	0	2	- - -	L̇
X. 1 - -	13	964	23	4	1	6	- - -	Ṅ
	17	944	30	9	1	6	- - -	Ȯ
Y. 1 - -	10	334	8	8	0	7	- - -	Ṗ
Z. 1 - -	4	995	3	11	5	2	- - -	L
	4	707	10	6	8	4	- - -	M
A. 2 -	11	642	4	10	1	0	- - -	O
	22	460	32	7	1	6	- - -	P
B. 2 - -	22	403	43	7	1	6	- - -	Q
	24	563	34	3	0	3	- - -	R
C. 2 -	20	793	28	6	0	4	- - -	S
	20	101	33	4	0	3	- - -	T
D. 2 - -	19	876	33	0	1	6	- - -	U
	23	406	35	9	0	4	- - -	V
E. 2 - -	23	943	42	8	0	4	- - -	*W*
	19	668	31	6	1	6	- - -	*X*
F. 2 - -	13	990	15	2	0	2	- - -	*Y*
G. 2 - -	4	800	20	8	1	5	- - -	*Z*
	5	866	39	2	1	6	- - -	1
H 2 - -	14	146	33	4	1	6	- - -	2
	18	966	34	10	2	0	- - -	3
I 2 - -	7	421	4	5	3	0	- - -	4
	8	899	-	-	-	-	- - -	5
K 2 - -	4	628	4	0	0	3	- - -	6
L 2 - -	3	864	22	4	1	10	- - -	*A*·
	13	394	29	3	5	10	- - -	*B*·
M 2 - -	16	744	42	0	1	8	- - -	*D*·
	18	824	29	5	1	6	- - -	*E*·
N 2 - -	16	924	33	7	1	6	- - -	*F*·
	9	974	33	7	1	6	- - -	*G*·
O 2 - -	11	024	29	1	1	6	- - -	*H*·
	16	854	17	5	0	2	- - -	*I*·
P 2 - -	9	634	25	2	1	6	- - -	*K*·
	16	184	29	5	1	6	- - -	*L*·
Q 2 - -	14	574	20	7	1	6	- - -	*M*·
	1	474	33	7	1	6	- - -	*N*·
R 2 - -	16	084	34	10	0	3	- - -	*O*·
	7	504	33	7	1	6	- - -	*P*·
S 2 - -	3	774	11	3	1	0	- - -	*Q*·
T 2 - -	2	468	18	1	14	0	Marl.	106
	11	657	24	8	8	4	- - -	105
U 2 - -	13	980	24	4	0	6	- - -	104
	13	157	24	7	5	4	- - -	103
V 2 - -	10	937	30	8	3	0	- - -	102
	6	970	17	4	4	6	- - -	101
W 2 - -	13	513	34	5	6	0	- - -	100
	12	424	29	3	3	0	Blue Clay.	*A*. 3
X 2 - -	10	964	28	3	1	0	- - -	*B*. 3
	11	454	30	9	1	6	- - -	*C*. 3
Y 2 - -	10	384	29	3	3	0	- - -	*D*. 3
Number 3.								
A 3 - -	15	412	5	0	1	6	Blue Clay.	*M* 4
	31	510	33	10	0	3	- - -	*L* 4
B 3 - -	32	117	37	1	1	6	- - -	*K* 4
	32	277	24	5	0	0	- - -	*I* 4

Letters of Reference in Bog No. 3.	Height of each Station in the Bog above Lough Derevereagh, R. 4.		Depth of Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog
	Feet.	Parts.	F.	I.	F.	I.		
C 3	31	867	27	8	1	6	Blue Clay.	*H* 4
	25	787	27	6	0	3	- - -	*G* 4
D 3	12	227	1	0	0	8	- - -	*F* 4
E 3	16	094	13	5	0	4	- - -	*R* 7
	26	837	19	6	0	4	- - -	*Q* 7
F 3	27	834	25	4	1	6	- - -	*P* 7
	26	886	36	11	1	0	- - -	*O* 7
G 3	29	635	21	6	0	4	- - -	*N* 7
	28	744	21	3	0	9	- - -	*M* 7
H 3	24	729	29	0	1	0	Marle.	L 7
I 3	21	203	42	6	1	4	Blue Clay.	K 7
K 3	5	124	0	0	0	0	- - -	8
	7	633	11	3	0	4	- - -	9
L 3	22	303	27	10	1	0	- - -	10
	24	791	15	10	1	0	- - -	11
M 3	21	368	25	11	0	5	- - -	12
	17	677	40	10	2	0	- - -	13
N 3	19	751	40	10	1	6	Marle.	14
	25	011	13	2	1	0	-	15
O. 3	22	916	25	4	0	5	- - -	16
P. 3	14	981	33	10	1	6	- - -	17
Q. 3	2	912	4	7	0	2	- - -	R
	17	072	19	0	0	2	- - -	S
R 3	22	802	26	2	1	6	- - -	T
	24	372	26	4	0	4	- - -	U
S 3	25	482	31	1	1	6	- - -	V
	26	572	17	1	1	6	- - -	W
T 3	23	492	26	2	0	6	- - -	X
	19	182	33	7	1	6	- - -	Y
U 3	20	162	26	7	1	6	- - -	Z
	22	072	15	0	1	6	- - -	*A*
V 3	22	222	0	5	0	4	- - -	*B*
W 3	21	142	17	5	1	6	- - -	*C*
X 3	2	354	27	3	3	6	Blue Clay.	*E* 3
Y 3	14	384	23	3	1	0	- - -	*F* 3
Z 3	21	594	21	7	0	3½	- - -	*G* 3
	23	674	37	7	0	6	- - -	*H* 3
A 4	24	174	28	0	1	2	- - -	*I* 3
	22	634	15	6	1	0	- - -	*K* 3
B 4	21	694	31	2	1	1½	- - -	*L* 3
	23	604	25	2	0	3	- - -	*M* 3
C 4	20	344	30	7	1	2½	- - -	*N* 3
	15	744	22	11	1	6	- - -	*O* 3
D 4	24	314	16	0	0	9	- - -	*P* 3
	22	284	19	3	0	3	- - -	Q 3
E 4	18	734	16	11	0	6	- - -	*R* 3
F 4	13	314	29	8	1	6	- - -	*S* 3
G 4	0	504	7	11	0	2	- - -	*H* ×
	9	688	27	2	1	6	- - -	*I* ×
H 4	1	384	5	10	1	2	- - -	*K* ×
	17	632	30	5	1	6	- - -	*L* ×
I 4	21	584	35	4	1	6	- - -	*M* ×
	18	662	21	2	0	9	- - -	*N* ×
K 4	10	482	19	4	0	6	- - -	*O*
	4	578	22	8	4	0	- - -	*P*
L 4	9	490	22	8	1	6	- - -	*R*
M 4	0	650	21	6	6	8	- - -	A. 1
	8	342	30	2	1	6	- - -	B. 2
N 4	12	674	22	0	1	2	- - -	C. 3
	9	112	34	0	1	6	- - -	D. 4
O 4	4	678	2	2	0	4	- - -	E. 5
	12	910	18	2	1	4	- - -	F. 6
P 4	8	286	24	2	1	9	- - -	G. 7
	16	252	24	2	1	6	- - -	H. 8
Q 4	16	748	24	0	1	1	- - -	I. 9
R. 4	0	000	22	9	6	0	- - -	K. 10
S 4	11	572	11	1	0	2	- - -	A. 11
	15	414	24	10	1	1	- - -	B. 11
T 4	16	106	30	5	1	6	- - -	C. 11
	12	906	37	9	3	2	- - -	D. 11
U 4	0	000	29	6	6	2	- - -	E. 11.

All the Stations in these Bogs are calculated to which is level with Lough Derevereagh, above the Sea.

Letters of Reference in Bog No. 3.	Height of each Station in the Bog above Lough Derevereagh, at R. 4.		Depth of Bog under each Station.		Depth of the under Stratum		Nature of the under Stratum	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
V 4 - -	6	880	9	11	1	4	Blue Clay	C. 12
	11	190	42	11	1	6	- - -	B. 12
W 4 - -	0	000	29	1	5	6	- - -	A. 12
Bog, No. 4.								
	9	627	0	10	1	0	- - -	E 4
	12	287	2	6	0	5	- - -	D 4
A. 5 - -	17	477	10	1	0	2	- - -	C 4
	22	507	25	7	0	4	- - -	B. 4
B. 5 - -	18	837	35	7	3	0	- - -	A 4
	20	340	19	2	0	4	- - -	N 4
C 5 - -	20	210	26	9	1	6	- - -	O. 4
	14	796	12	6	0	5	- - -	P 4
D 5 - -	—	766	lower than the station R 4 -				- - -	Q 4
	5	295	- - -		- - -		Meadow on Bog	I 7
E 5 - -	15	669	26	8	1	6	- - -	H 7
	5	871	6	11	0	2	- - -	G 7
F. 5 - -	18	890	- - -		- - -		Upland	F 7
	24	906	32	10	0	3	- - -	E 7
G 5 - -	26	745	46	0	2	4	- - -	D 7
	26	706	29	3	0	5	- - -	C 7
H 5 - -	23	861	29	10	1	0	- - -	B 7
	15	347	22	6	1	6	- - -	A. 7
I 5 - -	13	038	33	2	1	0	- - -	18
	21	789	29	4	1	0	Marl	19
K 5 - -	22	526	29	7	0	5	Upland	20
	19	526	9	3	0	4	Marl	21
L 5 -	24	548	13	11	0	4	Blue Clay	22
	28	753	45	11	0	5	Marl	23
M 5 - -	28	873	46	10	1	6	- - -	24
	26	952	31	4	1	0	- - -	25
N. 5 - -	19	709	23	9	0	3	Blue Clay	26
	3	751	26	0	1	6	- - -	27
O 5 - -	—	745	25	8	2	6	- - -	28
P 5 - -	13	602	31	10	1	6	- - -	.D.
	27	852	25	2	1	6	- - -	.E.
Q 5 - -	32	541	26	7	0	1	- - -	.F.
	24	872	12	0	0	6	- - -	.G.
R. 5 - -	24	722	8	1	1	6	Blue Clay	.H.
	34	622	29	5	1	6	- - -	.I.
S. 5 - -	33	972	33	2	1	6	- - -	.K.
	29	492	26	8	1	6	- - -	.L.
T. 5 - -	13	852	16	8	1	6	- - -	.M.
	8	072	0	0	0	0	- - -	.N.
U. 5 - -	5	734	30	6	1	4	- - -	T. 3
	15	284	30	5	1	6	- - -	U. 3
V. 5 - -	15	934	30	9	1	6	- - -	V. 3
	6	664	9	7	0	2	- - -	W. 3
W. 5 - -	17	904	17	10	0	2	- - -	X. 3
	18	514	21	2	0	3	- - -	Y. 3
X. 5 - -	3	464	11	5	2	6	- - -	Z. 3
Lower than R 4	—	176	5	9	0	2½	- - -	Z
Y. 5 - -	—	872	17	11	2	0	Blue Clay	S
	11	142	32	8	2	5	- - -	T
Z. 5 - -	4	132	27	5	1	6	- - -	U
Bog. No. 5.								
A. 6 - -	13	261	31	5	4	6	Blue Clay	E C.
	16	869	15	8	0	3	- - -	D.C.
B. 6 - -	11	877	30	10	5	6	- - -	C.C.
	10	037	35	11	5	6	- - -	B C.
C. 6 - -	5	313	29	11	5	0	- - -	A C.
D. 6 - -	21	345	41	2	2	2	- - -	G.D.
	19	481	34	5	1	6	- - -	F.D
E. 6 - -	8	036	15	6	1	6	- - -	E.D
	15	298	- - -		- - -		Upland	D.D
F. 6 - -	14	176	12	9	0	3	Blue Clay	G.D
	16	057	26	0	0	6	- - -	B.D
G. 6 - -	10	341	16	2	0	7	- - -	A.D
H. 6 - -	12	706	19	6	3	4	- - -	51
	13	583	28	11	3	0	- - -	50
I. 6 - -	17	317	37	7	6	8	- - -	49
	15	159	32	6	12	8	- - -	48

Letters of Reference in Bog No 5, in Maps 1 & 3.	Height of each Station in the Bog above Lough Dereveragh, at R 4.		Depth of Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
K. 6 - -	18	092	5	1	0	7	- - -	AX
	16	706	10	1	0	4	- - -	AW
L. 6 - -	28	102	25	3	0	7	- - -	AV
	28	952	37	10	2	7	- - -	AU
M. 6 - -	28	427	31	0	0	6	- - -	AT
	24	397	22	6	1	0	- - -	AS
N. 6 - -	25	286	-	- -	-	- -	Upland	AR
	23	895	14	2	1	1	Blue Clay	AQ
O. 6 - -	22	466	10	5	0	10	- - -	AP
	23	782	19	3	0	3	- - -	AO
P. 6 - -	19	107	16	10	0	3	- - -	AN
	15	310	21	7	1	4	- - -	AM
Q. 6 - -	21	731	42	8	1	6	- - -	AL
	22	881	31	7	3	0	- - -	AR
R. 6 - -	6	149	27	3	5	0	- - -	AI
S. 6 - -	16	247	10	6	0	3	Blue Clay -	*BA*
	23	194	16	5	0	7	- - -	*BB*
T. 6 - -	29	734	24	0	0	7½	- - -	*BC*
	32	381	27	0	0	7	- - -	*BD*
U. 6 - -	28	895	22	7	0	6	- - -	*BE*
	23	860	11	10	0	3	- - -	*BF*
V. 6 - -	29	886	25	3	0	7	- - -	*BG*
	31	921	27	6	1	6	- - -	*BH*
W. 6 - -	31	693	22	0	0	6	- - -	*BI*
	28	881	35	2	2	3	- - -	*BK*
X. 6 - -	17	152	6	3	0	3	- - -	*BL*
	13	890	14	9	3	0	- - -	*BM*
	16	458	21	8	2	6	- - -	*BN*
Bog, No. 6.								
A. 7 - -	12.	802	3	11	0	5	Blue Clay -	86
	23	074	32	17	5	4	- - -	85
B. 7 - -	21	019	18	3	0	4	- - -	84
	13	108	17	7	0	2	- - -	80
C. 7 - -	3	245	26	11	5	0	Marle - -	82
D. 7 - -	25	815	27	2	1	0	Blue Clay -	74
	29	390	28	10	1	6	Marle - -	73
E. 7 - -	26	329	25	3	0	2	Blue Clay -	76
	23	928	25	4	1	6	- - -	77
F. 7 - -	21	455	26	2	0	4	- - -	78
	15	821	22	2	1	4	Marle - -	79
G. 7 - -	6	429	15	5	6	2	- - -	80
	3	439	14	0	7	11	- - -	81
H. 7 - -	4	939	28	7	10	4	- - -	47
	15	755	34	3	9	8	Blue Clay -	46
I. 7 - -	22	578	39	5	4	6	Marle - -	45
	23	627	38	5	2	0	- - -	44
K. 7 - -	21	950	39	3	1	2	Blue Clay -	43
	24	792	-	-	upland -	-	- - -	42
L. 7 - -	27	643	29	1	1	6	- - -	41
	29	663	33	0	1	4	Marle - -	40
M. 7 - -	32	769	33	5	0	4	Blue Clay -	39
	32	563	40	2	1	6	- - -	38
N. 7 - -	28	331	16	2	1	2	- - -	37
	23	923	17	11	1	6	- - -	36
O. 7 - -	17	249	8	6	0	6	- - -	35
P. 7 - -	5	670	21	5	12	6	Marle - -	*AH*
	19	065	27	11	7	6	- - -	*AG*
Q. 7 - -	18	115	7	9	4	0	- - -	*AF*
	35	678	-	-	on land -	-	- - -	*AE*
R. 7 - -	16	051	-	-	on land -	-	- - -	*AD*
	17	735	-	-	upland -	-	- - -	*AC*
S. 7 - -	26	056	25	0	0	4	Sand - - -	*AB*
	33	624	42	3	1	0	Blue Clay -	*AA*
T. 7 - -	34	701	21	4	0	6	- - -	*X*
	27	235	10	2	0	3	- - -	*Y*
Bog. No. 7.								
A. 8 - -	14	890	3	6	0	5	Blue Clay -	34
	20	472	33	5	1	4	Marle - -	33
B. 8 - -	20	665	20	2	0	3	Blue Clay -	32
	11	890	8	5	0	3	- - -	31
C. 8 - -	17	650	23	8	1	4	Marle - -	30
	16	677	28	9	1	6	Blue Clay -	*A* 10
D. 8 -	18	878	42	5	1	6	- - -	*B* 10
	20	072	35	1	1	6	- - -	*C* 10

Letters of Reference in Bog No. 7, in Maps 1 & 3.	Height of each Station in the Bog above Lough Dereveragh, R. 4.		Depth of Bog under the Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
E. 8 - -	14	853	27	7	1	8	- - -	*D* 10
	8	737	34	9	6	8	- - -	*E* 10
F. 8 - -	12	574	34	1	4	6	- - -	*F* 10
	15	943	37	1	1	6	- - -	*G* 10
G. 8 - -	14	525	39	5	3	10	- - -	*H* 10
	11	503	17	6	0	6	- - -	*I* 10
H. 8 - -	1	764	2	9	0	2	- - -	*K* 10
	6	080	-	- upland	-	-	- - -	*L* 10
I. 8 - -	3	734	10	6	0	3	- - -	*M* 10
	1	104	16	0	3	0	- - -	*N* 10
J. 8 - -	17	920	9	10	1	0	- - -	*Q* 6
	21	992	29	5	1	2	Marle - -	*P* 6
K 8 - -	22	331	34	0	0	5	- - -	*O* 6
	20	521	32	8	3	0	Blue Clay -	*N* 6
L. 8 - -	16	488	33	4	1	6	- - -	*M* 6
	8	793	22	6	1	6	- - -	*L* 6
M. 8 - -	6	425	32	6	4	0	- - -	*K* 6
	13	928	26	8	1	6	Marle - -	*I* 6
N. 8 - -	17	250	38	0	3	0	Blue Clay -	*H* 6
	17	919	25	7	1	0	Marle - -	*G* 6
O. 8 - -	15	501	11	5	1	4	- - -	*F* 6
	15	279	14	3	1	5	Blue Clay -	*E* 6
P. 8 - -	18	216	20	1	0	3	- - -	*D* 6
	17	056	35	10	2	0	- - -	*C* 6
Q. 8 - -	7	005	10	11	0	8	Marle - -	*B* 6
	1	752	14	11	2	6	- - -	*A* 6
R. 8 - -	6	543	36	11	1	8	Blue Clay -	*I* 8
	14	039	29	3	2	0	- - -	*H* 8
S. 8 - -	19	228	23	9	2	2	- - -	*G* 8
	21	492	15	10	0	8	- - -	*F* 8
T. 8 - -	20	822	14	5	1	0	- - -	*E* 8
	21	439	25	7	0	4	- - -	*D* 8
U. 8 - -	21	723	32	7	1	6	- - -	*C* 8
	18	425	40	7	3	0	- - -	*B* 8
V. 8 - -	14	519	27	1	1	2	- - -	*A* 8
W. 8 - -	8	801	15	6	1	0	- - -	*A* 7
	18	318	44	6	1	6	White Clay -	*B* 7
X. 8 - -	23	416	25	4	2	9	- - -	*C* 7
	23	215	19	2	1	6	- - -	*D* 7
Y. 8 - -	28	213	-	- upland	-	-	- - -	*E* 7
	16	265	-	- upland	-	-	- - -	*F* 7
Z. 8 - -	7	467	15	8	1	6	Blue Clay -	*G* 7
Bog. No. 8.								
A 9 - -	137	915	8	0	0	0	Gravel -	*A*
	137	350	24	9	2	0	Blue Clay -	*B*
B 9 - -	134	140	18	7	0	6	- - -	*C*
	135	625	22	0	2	0	- - -	*D*
C 9 - -	135	485	6	0	-	- -	Limestone-gravel	*E*
	135	430	23	0	-	- -	- - -	*F*
D 9 - -	131	958	30	0	-	- -	- - -	*G*
	127	723	27	9	1	0	Blue Clay -	*H*
E 9 - -	120	855	18	6	0	9	- - -	*I*
	120	525	23	6	0	6	- - -	*K*
F 9 - -	115	000	15	1	-	- -	Limestone-gravel	*L*
	114	792	21	0	-	- -	- - -	*M*
G 9 - -	113	960	25	7	-	- -	- - -	*N*
	110	140	28	10	0	4	Blue Clay -	*O*
	110	680	29	2	0	7	- - -	*P*
H 9 - -	110	433	27	5	0	9	- - -	*Q*
	106	185	23	9	0	3	- - -	*R*
I 9 - -	96	315	10	10	0	3	- - -	*S*
	89	680	2	3	0	2	- - -	*T*
J 9 - -	135	652	-	- -	-	- -	Upland -	3
K 9 - -	138	532	-	- -	-	- -	- - -	2
L 9 - -	134	982	11	0	0	2½	Blue Clay -	*K* 3
	139	912	41	5	2	0	- - -	*I* 3
M 9 - -	138	512	25	8	0	3½	- - -	*H* 3
	134	092	19	2	0	4	- - -	*G* 3
N 9 - -	130	052	31	5	0	4	- - -	*F* 3
	126	620	29	7	0	5	- - -	*E* 3
	125	672	30	3	0	6½	- - -	*D* 3
	128	032	30	8	0	6	- - -	*C* 3
	127	112	10	0	0	3	- - -	*B* 3
	119	832	10	4	0	4	- - -	*A* 3

Letters of Reference in Bog No 5, in Maps 1 & 3.	Height of each Station in the Bog above Lough Derevereagh, at R. 4.		Depth of Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
O 9 - -	129	362	10	1	0	8	- - -	*A* 1
	128	932	28	0	1	0	- - -	*B* 1
P 9 - -	125	952	37	0	0	4	- - -	C 1
	125	922	32	7	0	11	- - -	*D* 1
Q 9 - -	124	332	25	3	0	8	- - -	*E* 1
	121	382	24	4	0	4	- - -	*F* 1
R 9 - -	105	172	10	10	0	5	- - -	*G* 1
S 9 - -	119	877	7	5	0	5	- - -	*A* 2
	128	497	25	9	1	6	- - -	*B* 2
T 9 - -	123	580	30	2	0	9	- - -	C 2
	120	080	29	5	0	6	- - -	*D* 2
U 9 - -	116	610	28	5	0	9	- - -	*E* 2
	119	610	18	9	0	7	- - -	*F* 2
V 9 - -	114	090	12	6	0	3	- - -	*G* 2
W 9 - -	119	832	10	4	0	4	- - -	*A* 3
X 9 - -	127	306	9	0	0	1	- - -	*L* 4
	132	076	23	0	0	6½	- - -	*K* 4
	130	786	27	2	0	7	- - -	*I* 4
	130	926	34	10	0	3	- - -	*H* 4
	119	346	11	2	0	1	- - -	*G* 4
	121	506	21	10	0	8	- - -	*F* 4
	118	356	24	5	1	6	- - -	*E* 4
	111	916	28	1	0	5½	- - -	*D* 4
	115	176	30	11	0	4	- - -	C 4
	120	906	19	3	0	3	- - -	*B* 4
Y - - -	111	976	10	4	0	5	- - -	*A* 4
Z - - -	112	118	8	2	0	3	Yellow Clay	C 3
Z 9 - -	121	723	29	1	0	2	- - -	*B* 3
A 10 - -	107	240	21	3	1	6	- -	*A* 3
	96	515	6	4	2	0	Blue Clay -	*E* 5
B 10 - -	102	328	20	4	0	3	- - -	*D* 5
	105	788	30	1	0	5	- - -	C 5
C 10 - -	107	712	17	2	1	0	- - -	*B* 5
	98	157	4	2	1	6	- - -	*A* 5
D 10 - -	89	016	16	9	1	6	- - -	*A* 6
	91	668	21	5	1	6	Marle -	*B* 6
	102	143	23	11	0	2	Blue Clay -	C 6
	104	876	18	10	1	0	- - -	*D* 6
E 10 - -	102	186	19	1	0	9	- - -	*E* 6
F 10 - -	76	760	16	9	0	1	- - -	*A*
	78	658	24	7	0	7	- - -	*B*
G 10 - -	79	016	29	10	0	8	- - -	*C*
	80	084	32	0	0	6	- - -	*D*
H 10 - -	78	890	31	11	0	8	- - -	*E*
	72	102	30	11	2	4	- - -	*F*
I 10 - -	60	350	20	8	2	8	- - -	*G*
	51	409	8	3	1	5	- - -	*H*
	63	148	14	1	0	4	- - -	*I*
K 10 - -	66	035	5	5	0	3	- - -	*K*
L 10 - -	62	240	8	5	0	2	- - -	*L*
	60	274	25	2	0	8	- - -	*M*
M 10 - -	67	452	23	6	0	4	- - -	*N*
N 10 - -	74	542	7	11	0	3	- - -	11
	74	664	27	2	0	7	- - -	10
O 10 - -	69	466	24	1	0	7	- - -	9
	74	244	33	11	0	8	- - -	8
P 10 - -	71	756	36	0	0	4	- - -	7
	70	606	33	9	0	2	- - -	0
Q 10 - -	69	648	36	9	0	3	- - -	1
	65	926	36	7	0	1	- - -	2
R 10 - -	64	874	34	3	0	4	- - -	3
	63	448	31	4	0	2	- - -	4
S 10 - -	61	860	25	1	0	6	- - -	5
	50	652	14	4	0	2	- - -	6
T 10 - -	72	750	15	3	0	1	- - -	*P*
	65	152	15	9	0	8	- - -	*Q*
U 10 - -	55	442	3	9	0	7	- - -	*R*
V 10 - -	46	338	5	6	0	2	- - -	*S*
	56	940	23	7	0	3	- - -	*T*
W 10 - -	55	739	20	10	0	6	- - -	*V*
	42	585	20	9	1	8	- - -	*W*
X 10 - -	46	810	13	4	0	5	- - -	*X*
A 11 - -	42	319	30	3	0	2	- - -	*C*
	47	783	36	11	0	2	- - -	*D*

Letters of Reference on Bog No 8, in Maps 1 & 3.	Height of each Station in the Bog above Lough Derevereagh, at R. 4.		Depth of Bog under each Station.		Depth of the under Stratum		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
B 11 - -	50	053	37	0	0	6	Blue Clay -	*E*
	50	175	28	8	1	2	- - -	*F*
C 11 - -	48	681	28	3	1	1	- - -	*G*
C. 11 - -	48	077	35	7	0	7	- - -	H
	48	817	28	7	0	5	- - -	I
D. 11 - -	48	987	18	5	0	7	- - -	K
E. 11 - -	34	189	12	7	0	3	- - -	L
	35	809	29	0	0	4	- - -	M
F. 11 - -	48	077	35	7	0	7	- - -	H
	41	285	36	11	0	7	- - -	N
G. 11 - -	28	623	7	6	0	6	- - -	O
	27	374	31	3	0	3	- - -	P
H. 11 - -	24	434	25	1	0	4	- - -	Q
	15	486	27	1	0	4	- - -	R
I. 11 - -	4	038	13	3	2	0	- - -	S
J. 11 - -	—	862	Lower than R 4.				About half this Lake is less than	
	19	205	29	8	0	2	5 feet deep, the reſt 12 feet.	
J. 11 - -	19	205	29	8	0	2	Blue Clay -	T
K. 11 - -	23	449	34	4	2	0	- - -	V
	23	726	37	2	0	4	- - -	W
L. 11 - -	23	891	35	9	0	6	- - -	X
	26	791	32	7	0	5	- - -	Y
M. 11 - -	19	105	17	6	0	3	- - -	Z
	32	421	8	9	0	3	- - -	8
	45	881	29	4	0	2	- - -	6
	46	733	36	10	0	4	- - -	7
N. 11 - -	35	325	17	3	0	6	- - -	5
O. 11 - -	10	898	23	3	0	4	- - -	2
	22	124	20	10	0	2	- - -	1
P. 11 - -	19	554	13	0	0	5	- - -	1
Q. 11 - -	39	795	44	6	0	6	- - -	2
R. 11 - -	39	625	36	7	0	4	- - -	3
S. 11 - -	27	471	25	1	0	9	- - -	4
T. 11 - -	25	726	36	0	0	2	- - -	5
U. 11 - -	30	047	26	10	0	6	- - -	6
V. 11 - -	25	859	18	4	1	0	- - -	7
W. 11 - -	19	477	37	8	0	3	- - -	8
X. 11 - -	15	261	28	0	0	4	- - -	9
Y. 11 - -	10	041	17	4	0	5	- - -	10
Z. 11 - -	—	889	11	6	0	3	- - -	11

TABLE of the HEIGHT of each STATION in BOG No. 14 and 15, above LOUGH REE, with the Depths and Nature of the Bog and Understratum.

Letters of Reference on Bog No 15, in Maps 1, 2, 3	Height of each Station in the Bog above Lough Ree.		Depth of the Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	Feet.	Inch.	Feet.	Inch.		
A - - -	2	381	- -	-	- -	-	Upland -	D
B - - -	32	247	11	4	- -	-	- - -	2
C - - -	33	044	21	7	- -	-	- - -	3
D - - -	40	235	37	9	- -	-	- - -	4
E - - -	34	147	13	3	0	7	Blue Clay -	5
F - - -	16	615	19	10	1	6	- - -	6
G - - -	33	152	29	5	1	3	- - -	7
H - - -	25	797	41	9	2	0	- - -	8
I - - -	26	485	27	7	0	3	- - -	9
K - - -	33	450	30	9	5	0	- - -	10
L - - -	29	386	- -	-	- -	-	Upland -	11
M - - -	37	395	18	2	0	8	Blue Clay -	12
N - - -	45	498	23	6	0	4	- - -	13
O - - -	49	206	23	10	4	0	- - -	14
P - - -	38	024	23	8	2	0	- - -	15
Q - - -	34	176	19	8	0	7	- - -	16
R - - -	44	618	- -	-	- -	-	Upland -	17
S - - -	55	777	24	9	0	9	Blue Clay -	18
T - - -	59	978	12	9	0	7	- - -	19

Letters of Reference on Bog No. 15, in Maps 1, 2, 3.	Height of each Station in the Bog above Lough Ree.		Depth of the Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
U	57	778	10	8	0	5	-	20
V	49	509	22	9	0	4	-	21
W	52	801	16	0	0	10	-	22
X	47	605	17	5	0	5	-	23
Y	40	939	14	10	1	0	-	24
Z	34	085	22	7	0	3	-	25
A. 1	29	205	-	-	-	-	Upland	26
B. 1	28	829	27	5	0	5	Blue Clay	27
C. 1	21	944	37	2	0	7	-	28
D. 1	14	123	-	-	-	-	Upland	29
E. 1	10	010	-	-	-	-	Upland	30
F. 1	6	284	-	-	-	-	-	31
G. 1	27	290	-	-	-	-	-	32
H. 1	34	737	41	1	0	4	Blue Clay	33
I. 1	33	968	39	5	0	6	-	34
K. 1	34	380	40	3	0	8	-	35
L. 1	28	453	29	0	0	10	-	36
M. 1	12	363	-	-	-	-	Upland	40
N. 1	24	987	22	11	0	7	Blue Clay	41
O. 1	30	113	20	6	0	10	-	42
P. 1	29	708	25	7	0	9	-	43
Q. 1	31	353	33	10	-	-	-	44
R. 1	27	887	33	10	-	-	-	45
S. 1	28	230	18	10	-	-	-	46
T. 1	34	372	18	4	-	-	-	47
U. 1	38	753	21	3	2	3	-	48
V. 1	39	793	22	7	0	7	-	49
W. 1	46	303	24	3	0	7	-	50
X. 1	52	958	15	6	0	5	-	51
Y. 1	47	835	3	9	0	7	-	52
Z. 1	51	106	31	10	2	1	-	53
In Maps 1, 2, 4								
A 2	51	424	26	10	0	8	Blue Clay	54
B 2	50	402	9	4	1	1	-	55
C 2	73	344	-	-	-	-	Upland	56
D 2	66	856	10	3	0	6	Blue Clay	57
E 2	71	999	12	5	0	6	-	58
F 2	71	709	3	7	0	6	-	59
G 2	71	917	31	1	0	3	-	60
H 2	74	549	25	2	0	1	-	61
I 2	75	887	1	2	0	1	-	62
K 2	77	061	4	9	0	5	-	63
L 2	72	707	16	8	0	1	-	64
M 2	68	531	33	11	0	7	-	65
N 2	24	904	29	5	0	5	-	66
O 2	47	099	12	11	0	1	-	67
P 2	30	763	-	-	-	-	Flooded-land	68
Q 2	19	983	32	5	-	-	Blue Clay	*C*
R 2	28	664	20	2	0	8	-	*B*
S 2	29	538	22	11	0	11	-	*A*
T 2	36	295	18	7	1	0	-	70
U 2	24	566	21	6	0	4	-	73
V 2	38	220	22	5	0	5	-	74
W 2	30	162	24	10	0	6	Blue Clay	76
X 2	14	409	27	9	1	0	-	78
Y 2	27	812	27	8	3	0	-	79
Z 2	38	854	23	2	0	8	-	81
A 3	32	957	3	11	-	-	-	83
B 3	14	857	27	0	Depth of the Slit in the Rock at Clonfour.			
C 3	51	784	27	10	0	7	-	86
D 3	51	734	37	8	0	10	Marle	87
E 3	37	407	-	-	-	-	Upland	88
F 3	36	540	23	3	0	7	Blue Clay	89
G 3	44	497	16	5	0	5	-	90
H 3	40	669	41	9	2	0	-	91
I 3	66	026	-	-	-	-	Upland	92
K 3	45	171	27	3	2	7	Blue Clay	88
L 3	46	231	27	2	0	4	-	87
M 3	48	173	17	0	0	6	-	86
N 3	49	146	3	11	0	2	-	85
O 3	51	125	33	4	2	0	-	97
P 3	54	185	23	6	0	4	-	98
Q 3	39	246	24	9	0	7	-	99
R 3	36	706	20	6	3	0	-	100

Letters of Reference on Bog No 15. in Maps 1, 2, 4	Height of each Station in the Bog above Lough Ree.		Depth of the Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
S 3 - -	40	311	24	0	0	7	Blue Clay -	101
T 3 - -	52	915	18	11	0	6	- - -	102
U 3 - -	63	740	-	-	-	-	Upland -	103
V 3 - -	56	294	18	0	0	2	Blue Clay -	104
W 3 - -	56	541	-	-	-	-	Upland -	105
X 3 - -	81	311	-	-	-	-	Upland -	106
Y 3 - -	64	859	15	5	0	6	Blue Clay -	107
Z 3 - -	49	239	10	0	0	4	- - -	108
A 4 - -	37	894	4	7	0	4	Blue Clay -	
B 4 - -	56	307	11	11	0	2	- - -	108
C 4 - -	59	045	15	5	0	2	- - -	109
D 4 - -	62	937	21	5	0	4	- - -	110
E 4 - -	64	391	23	8	0	2	- - -	111
F 4 - -	56	572	23	6	0	10	- - -	112
G 4 - -	64	195	17	1	0	10	- - -	113
H 4 - -	66	276	31	1	0	3	- - -	114
I 4 - -	72	767	19	11	0	4	- - -	115
K 4 - -	76	587	21	5	0	5	- - -	116
L 4 - -	67	786	23	1	0	9	- - -	117
	65	647	29	10	-	-	- - -	
M 4 - -	15	940	6	1	0	10	- - -	118
N 4 - -	42	438	-	-	-	-	Upland -	119
O 4 - -	36	553	-	-	-	-	- - -	120
P 4 - -	35	018	28	1	1	6	- - -	121
Q 4 - -	40	043	20	5	0	4	- - -	122
R 4 - -	31	738	23	8	0	4	- - -	123
S 4 - -	36	188	26	6	1	0	- - -	124
T 4 - -	54	928	-	-	-	-	Upland -	125
U 4 - -	63	907	27	10	0	6	Blue Clay -	126
V 4 - -	69	465	33	10	-	-	- - -	127
W 4 - -	73	787	29	5	-	-	- - -	128
X 4 - -	77	471	14	5	1	3	- - -	129
Y 4 - -	61	716	-	-	-	-	Upland -	130
Z 4 - -	21	382	19	10	2	0	Blue Clay -	131
A 5 - -	24	063	30	7	2	9	- - -	132
B 5 - -	-	-	18	3	7	7	- - -	133
C 5 - -	21	385	17	4	1	0	- - -	134
D 5 - -	26	937	17	5	-	-	- - -	135
E 5 - -	6	001	27	5	6	0	- - -	136
F 5 - -	35	240	-	-	-	-	Upland -	137
G 5 - -	43	174	11	4	0	1	- - -	138
H 5 - -	0	000	-	-	-	-	Lough Ree -	141
I 5 - -	19	896	27	5	0	6	- - -	142
K 5 - -	15	269	19	9	0	9	- - -	143
L 5 - -	25	844	30	7	1	0	- - -	144
M 5 - -	20	618	18	6	0	4	- - -	145
A 6 - -	0	873	18	8	1	0	- - -	*A* 11
B 6 - -	27	053	32	4	1	2	- - -	*B* 11
C 6 - -	30	395	27	1	1	9	- - -	*C* 11
D 6 - -	31	545	32	2	0	10	- - -	*D* 11
E 6 - -	30	414	34	8	0	10	- - -	*E* 11
F 6 - -	29	431	28	5	0	6	- - -	*I* 11
G 6 - -	31	201	28	10	0	6	- - -	*F* 11
H 6 - -	16	971	10	0	1	2	- - -	*G* 11
	12	994	3	5	1	2	- - -	*O* 11
I 6 - -	25	409	27	8	0	10	- - -	*N* 11
K 6 - -	19	976	38	0	1	6	- - -	*M* 11
L 6 - -	17	376	25	0	1	6	- - -	*L* 11
M 6 - -	21	371	17	8	1	6	- - -	*K* 11
N 6 - -	30	171	6	1	0	10	- - -	*H* 11
O 6 - -	34	062	-	-	-	-	- - -	*L* 1
P 6 - -	23	585	21	0	0	2	- - -	*B* 1
Q 6 - -	8	055	-	-	-	-	- - -	*N* 1
R 6 - -	19	555	27	6	1	5	- - -	*A* 1
S 6 - -	32	733	41	8	1	0	- - -	*C* 1
T 6 - -	24	258	24	8	0	8	- - -	*D* 1
U 6 - -	34	583	20	4	0	10	- - -	*E* 1
V 6 - -	38	727	35	1	3	2	- - -	*F* 1
W 6 - -	36	284	22	3	0	4	- - -	*G* 1
X 6 - -	38	127	29	5	0	2	- - -	*H* 1
Y 6 - -	38	002	40	6	2	2	- - -	*I* 1
Z 6 - -	22	512	9	9	0	10	- - -	*K* 1
A 7 - -	31	208	3	10	0	9	- - -	*L*
B 7 - -	45	643	38	8	0	8	- - -	*K*
C 7 - -	52	598	40	2	0	10	- - -	*I*

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Letters of Reference on Bog No 15, In Maps 1, 2, 4	Height of each Station in the Bog above Lough Ree		Depth of the Bog under each Station.		Depth of the under Stratum.		Nature of the under Stratum.	Marks cut on the Bog.
	Feet.	Parts.	F.	I.	F.	I.		
D 7 - -	54	843	12	3	1	6	- - -	*H*
E 7 - -	58	743	28	0	0	10	- - -	*G*
F 7 - -	57	588	41	10	0	10	- - -	*F*
G 7 - -	58	338	37	6	0	10	- - -	*E*
H 7 - -	62	933	17	1	0	10	- - -	*D*
I 7 - -	61	523	25	0	0	4	- - -	*C*
K 7 - -	62	188	29	0	0	5	- - -	*B*
L 7 - -	49	088	7	8	0	2	- - -	*A*
M 7 - -	57	953	26	2	0	10	- - -	*M*
N 7 - -	54	843	31	1	1	6	- - -	*N*
O 7 - -	42	931	18	7	0	6	- - -	*O*
P 7 - -	26	41	5	7	0	6	- - -	*P*
Q 7 - -	56	688	11	1	0	2	- - -	*T*
R 7 - -	59	308	32	4	1	2	- - -	*S*
S 7 - -	57	232	25	6	1	6	- - -	*R*

NAMES of the PROPRIETORS of the BOGS, in District No. 7.

No.	NAMES of the BOGS.	CONTENTS.			PROPRIETORS NAMES.
		A.	R.	P.	
1	Deragh - - - - -	943	0	0	William Gore, Esquire. James McEvoy, Esquire. Alexander Burrowes. Reverend Dean Bourke, and many others.
2	Camma - - - - -	1,473	0	0	Reverend Dean Bond. Reverend Mr. Murphy. James Nugent. Sir B. Chapman, &c.
3	Botany - - - - -	1,363	0	0	—— Sproule, Esquire. —— Drought, Esquire. Lord Darnley. Thomas Fitzgerald, &c.
4	Derrad - - - - -	664	0	0	Lord Darnley. —— Sproule, Esquire. &c.
5	Derrycrave - - - -	809	0	0	William Gore, Esquire. Marquis of Buckingham, &c.
6	Newcastle - - - -	537	0	0	—— Pollard, Esquire, &c.
7	Coolure - - - - -	862	0	0	Thomas Smith, Esquire. Admiral Packenham. —— Pollard, Esquire, &c.
8	Clonshinnogh - - -	861	0	0	E. Croker, Esquire, &c.
9	Clonwhelan - - - -	610	0	0	—— Popham, &c.
10	Newpass - - - - -	453	0	0	T. B. Whitney, Esquire, &c.
11	Foxhall - - - - -	850	0	0	Rd Fox, Esquire, &c.
12	Gowlan - - - - -	773	0	0	J. Goldsbury, &c.
13	Rinn - - - - - -	1,238	0	0	Rt Gunning. —— Montfort, &c.
14	Cloncroft - - - -	1,683	0	0	Captain Davies and Montford.
15	Great tract of Shannon Bog - - - - -	7,379	0	0	B. Shouldham, Lady Ross, Luke Fox, Esquire, &c.
16	Fort-hill - - - - -	420	0	0	Lady Ross, &c.
17	Ethera - - - - -	441	0	0	J. Ledwith, Esquire, &c.
	TOTAL Quantity - - A	21,367	0	0	

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APPENDIX, No. 9.

Copy of a LETTER from Mr. DAVY, to the Secretary of the Commissioners.

Sir, 1st February 1811.

AS the Commissioners for considering the practicability of draining the Bogs of Ireland have done me the honour of requesting my opinion on the important national object to which their attention is directed, I shall without apology beg leave to communicate to them, through your means, such observations as I have been able to make on the subject.

Bogs in general are known to consist of inert vegetable matter, covered more or less with unproductive vegetables, and containing a large quantity of stagnant water. There are two causes why they are unfitted for cultivation. One is the existence of stagnant moisture, the other is the excess of inert vegetable matter.

There is but one mode of removing the stagnant water which belongs to the practical Engineer, and that is by Draining; the different modes of effecting this have been so ably discussed in the Reports before the Commissioners, and which they were pleased to request me to peruse, that it would be presumptuous in me to offer any observations upon this part of the Enquiry.

The mode of removing the excess of inert vegetable matter, and of rendering it useful, is a subject which more immediately comes within the province of chemistry; and on this I shall venture to offer some suggestions.

Bogs differ very much in their composition. In general 100 parts of dry peat contain from 60 to 99 parts of matter destructable by fire, and the residuum consists of earths, usually of the same kind as the sub-stratum of clay, marle, gravel, or rock, on which they are found, and oxide of Iron. Burning furnishes a simple mode of destroying the inert vegetable matter, and where the peat contains much earthy matter, tends to supply that which is necessary in every fertile soil, a due proportion of the earths. From the analyses of Mr. Griffiths of several specimens of a particular Bog, it appears however that this practice will not be universally applicable, for he found 1440 parts of several specimens of peat affording only from 12 to 50 parts of ashes; the proportions being greatest in the lower strata. In cases when lime can be applied to the surface of Bogs there can be no doubt of its beneficial efficacy. If used in its state of quicklime it not only destroys excess of vegetable matter, but forms a compost extremely favourable to the vegetation of esculent plants. The peat-hills of Derbyshire have many of them been rapidly brought into cultivation, by merely draining, and scattering lime over the surface; and treated in this way, they admit I believe of being ploughed up the second year, and sown with Oats, or planted with Potatoes. Any kind of soil will improve peat; sand, clay, or marle, must be all beneficial, because a great object is to increase the quantity of earth in proportion to the vegetable matter. If a peat is of a black colour, soft consistence, and contains living vegetables at the surface, it will probably be easy of improvement by liming, or the application of the earths. If it is an inert red peat, containing little decomposing vegetable matter, and having only moss at its surface, there is reason to conceive that attempts at improvement should be preceded by burning the surface.

To render Bogs arable land capable of bearing white crops, there must be a certain quantity of earth added to the vegetable matter, or a certain quantity of vegetable matter destroyed, but it appears probable that many Bogs may be made into good pasture by draining and sowing indigenous or foreign grasses, particularly if irrigation can be employed. In England this practice has been particularly successful. At Priestly near Woburn, and at Castle Acre, there are meadows which have been rapidly reclaimed from Bog, and which produce luxuriant and excellent crops of Grass in consequence of Irrigation.

The Commissioners will appreciate the value and importance of my excellent friend Dr. Richardson's ideas on the improvement of Bogs, by cultivating on them the indigenous Irish Grasses.

From a comparison of the able Reports of Messrs. Edgworth and Griffiths, it appears evident that very different plans of cultivation must be adopted in different cases. The chemical composition of Bogs, and the ashes they afford, differ exceedingly, as I have found in various experiments upon specimens of peat from different districts.

The peat of the chalk counties of England contains much gypsum; but I have found very little in any specimens from Ireland or Scotland; and in general these peats contain very little saline matter.

There are peculiar advantages which will strike every one in judging of the practicability of improving most of the great Bogs in Ireland, the quantity of limestone and limestone-gravel in the neighbouring districts, and the marl or clay which in so many cases forms the sub-stratum of the Bog. If the draining can be easily effected, if the upper stratum can

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by mechanical means be freed from its excess of water, there is no doubt that its cultivation might be rapidly effected.

A few experiments upon the modes of improving these Bogs most unlike each other, would be, perhaps, the best preliminary step towards laying the foundations for the great national undertaking.

This would probably lead to particular plans for each particular district, which would be directed by a minute knowledge of the local circumstances, and by chemical analyses, pointing out the particular nature of the peat.

A soil covered with peat is a soil covered not only with fuel but likewise with manure. It is the excess of manure only which is detrimental; and it is much more easy to destroy it than to create it. To cultivate a Bog is a much less difficult task than to improve a sand. If there is a proper level to admit of draining, the larger the scale of operation the less must the comparative expense be, because machinery may for many purposes take the place of manual labour; and the trials that have been already made by private individuals, and which are stated in the different Reports, prove not only the feasibility of the general project, but afford strong grounds to believe that any capital expended upon it, after mature and well-digested plans, would in a very few years afford a great and increasing interest, and would contribute to the wealth, prosperity and population of the Island.

I have the honour to be, Sir,

Your most obedient Servant,

H. DAVY.

To J. B. Macarthy, Esq. Sec^{y} to the Commissioners
for considering the practicability of draining the Bogs
in Ireland.